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# Learningful Play: Exploring the design of technology, learning and play to enhance children's engagement with cultural heritage in schools and museums

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A thesis submitted 2020 to the School of Education,  
National University of Ireland, Galway,  
for the degree of  
Doctor of Philosophy (Ph.D.)

## Dedication

*Dedicated to the memory of my father, James Kearns who died during my Ph.D. candidature. His support for, and encouragement of, my life long interests and learning opportunities will always be appreciated.*

*Requiescat in Pace*

## Declaration

I declare that the work presented in this thesis is to the best of my knowledge and belief original and my own work, except as otherwise acknowledged in the text. The material has not been submitted, either in whole or part, for a degree at this or any other university.

*Sally McHugh*

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Sally McHugh  
31<sup>st</sup> October 2020



## Abstract

This research explores the design, development and evaluation of a **Technology-enhanced Cultural Heritage Education (TECHe)** learning model to enhance children's engagement with their local heritage and place. Following an exploratory pilot study playful learning emerged as a way forward for engaging children with their local heritage. Drawing on the theoretical work of Mitch Resnick (2006), 'learningful play' which is a combination of play, technology and learning, was adopted as a learning approach. The potential of learningful play for heritage education is that it fosters deep learning and engagement with subject matter. Using a design-based research (DBR) methodology, this research set out to explore if learningful play could enhance children's engagement with heritage and place. DBR is a flexible, iterative, interventionist approach for designing practical solutions to complex educational problems and is carried out in natural educational settings. Thus, it was deemed to be a suitable approach for bridging formal and informal learning environments. A multi-ontological theoretical framework guided the design. Theories included constructivism, constructionism, place-based learning, flow and playful learning. Through three design cycles, the research explored the development of learningful play using an experiential learning approach that included a physical field trip/museum tour and a digital storytelling (DST) workshop for children. 131 young people (97 in schools and 34 in museums) participated in the study. These seven interventions were undertaken in four Irish primary schools, two in a local museum and one in an American museum. The design process employed a range of methodological tools, including questionnaires, surveys, daily reflections, reflection journals, ethnographic observations, focus groups, video and audio recordings. The data collected was informed by the *TECHe* framework and the extant research literature and was carefully analysed. The *TECHe* prototype design model which emerged from the first six interventions and two design cycles detail five criteria, twelve design sensitivities and eight supporting design informants for implementing learningful heritage play in a museum or school setting. A central aim of DBR is to share design models with other educators and researchers to inform educational practice. A significant contribution of this research is the adaptation of the *TECHe* design model to an American setting. In the final seventh intervention the *TECHe* model was adapted to a new localised museum context resulting in a new model *Sense of Place*. Both models offer the potential for integration into heritage and place learning programmes in schools and museums. Future research is positioned in the context of the Covid-19 global pandemic. Education is changing. Schools and museums are faced with rolling closures and are dealing with new digital directions. Both prototype models from this research can be adapted to hybrid (physical and digital) learning resources for educators in schools and museums.

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# Table of Contents

DEDICATION .....	II
DECLARATION .....	III
ABSTRACT .....	IV
ACKNOWLEDGEMENTS .....	V
LIST OF TABLES .....	X
LIST OF FIGURES.....	XI
LIST OF ACRONYMS AND ABBREVIATIONS.....	XIV
<b>CHAPTER 1 INTRODUCTION TO THE RESEARCH.....</b>	<b>1</b>
1.1 RESEARCHER RATIONALE.....	1
1.1.1 <i>The Importance of Heritage Education</i> .....	2
1.1.2 <i>Heritage Education in Schools and Museums</i> .....	3
1.2 CHILDREN’S ENGAGEMENT WITH HERITAGE.....	4
1.2.1 <i>What is Engagement?</i> .....	4
1.2.2 <i>“The Experience is Everything”</i> .....	5
1.3 LEARNINGFUL PLAY AS AN APPROACH TO HERITAGE ENGAGEMENT .....	6
1.3.1 <i>Harnessing Children’s Everyday Use of Technology for Learning</i> .....	6
1.3.2 <i>Education and Technology in the Covid-19 Pandemic</i> .....	7
1.3.3 <i>Digital Storytelling</i> .....	7
1.4 RESEARCH QUESTIONS, OBJECTIVES AND METHODOLOGY .....	8
1.4.1 <i>Brief Summary of Methodology, Contribution and Theoretical Framework</i> .....	8
1.4.2 <i>General Overview of The Research Design</i> .....	10
1.4.3 <i>Scope and Context</i> .....	11
1.4.4 <i>Fulbright-Creative Ireland Museum Fellowship 2018-2019</i> .....	11
1.4.5 <i>Ethical Considerations</i> .....	12
1.4.6 <i>Outline of Chapters</i> .....	13
1.5 CHAPTER SUMMARY .....	14
<b>CHAPTER 2 LITERATURE REVIEW.....</b>	<b>15</b>
2.1 SECTION ONE -HERITAGE AND PLACE .....	15
2.1.1 <i>Working definitions</i> .....	15
2.1.2 <i>Concept of heritage</i> .....	16
2.1.3 <i>Concept of place</i> .....	16
2.1.4 <i>Developing a sense of place and community</i> .....	17
2.1.5 <i>How heritage is associated with meaning, belonging and identity</i> .....	18
2.2 CHALLENGES AND DEBATES WITH HERITAGE .....	19
2.2.1 <i>Values and ‘whose heritage’ in heritage</i> .....	19
2.2.2 <i>‘Found’ heritage versus ‘made’ heritage debate</i> .....	21
2.3 HERITAGE EDUCATIONAL PRACTICES .....	22
2.3.1 <i>Where does heritage and place fit as disciplines in education?</i> .....	22
2.3.2 <i>Place-based education</i> .....	22
2.3.3 <i>Formal, non-formal, free choice and informal learning environments</i> .....	24
2.4 HERITAGE EDUCATION AND LEARNING IN SCHOOLS .....	25
2.4.1 <i>The Irish formal education system</i> .....	25
2.5 HERITAGE EDUCATION AND LEARNING IN MUSEUMS.....	29
2.5.1 <i>The role of the museum</i> .....	29
2.5.2 <i>Education and learning in museums</i> .....	30
2.5.3 <i>Balancing fun and entertainment in the museum</i> .....	31

2.6 HOW ARE CHILDREN ENGAGING WITH HERITAGE AND PLACE?.....	31
2.6.1 <i>Formal School Heritage Education</i> .....	32
2.6.2 <i>Other Out-of-School Heritage Education Opportunities</i> .....	33
2.6.3 <i>Informal and Online Learning in Museums</i> .....	34
2.6.4 <i>Playful approaches to heritage education</i> .....	39
2.7 SECTION TWO – LEARNINGFUL PLAY.....	41
2.8 THE ROLE OF TECHNOLOGY.....	41
2.8.1 <i>Technology in education</i> .....	41
2.8.2 <i>ICT, educational technologies and technology-enhanced learning environments</i> .....	42
2.8.3 <i>Challenges and concerns with children’s use of technology</i> .....	42
2.8.4 <i>iPads as a support for learning</i> .....	44
2.8.5 <i>Making and digital making</i> .....	46
2.8.6 <i>STEAM Pedagogy – a boundary</i> .....	47
2.8.7 <i>Video Games and learning</i> .....	47
2.8.8 <i>Storying cultural heritage through digital storytelling</i> .....	53
2.9 PLAY AND CREATIVITY.....	59
2.9.1 <i>Play and its relationship to creativity</i> .....	65
2.10 DRAWING IT ALL TOGETHER – LEARNINGFUL HERITAGE PLAY.....	68
2.11 CHAPTER SUMMARY.....	69
<b>CHAPTER 3 THEORETICAL FRAMEWORK.....</b>	<b>70</b>
3.1 OUTLINE OF CONCEPTUAL FRAMEWORK.....	71
3.2 TWO OVERARCHING THEMES.....	72
3.2.1 <i>Materiality</i> .....	72
3.2.2 <i>Learningful Play</i> .....	73
3.3 CHAPTER SUMMARY.....	87
<b>CHAPTER 4 METHODOLOGY.....</b>	<b>88</b>
4.1 CHARACTERISING THE PROBLEM.....	88
4.2 PHILOSOPHICAL STANCE.....	88
4.3 METHODOLOGY REQUIREMENTS.....	90
4.3.1 <i>Methodological approach</i> .....	91
4.3.2 <i>Qualitative approach rationale</i> .....	91
4.3.3 <i>Qualitative approach and methodological paradigm</i> .....	92
4.4 DESIGN-BASED RESEARCH (DBR).....	92
4.4.1 <i>Origins</i> .....	92
4.4.2 <i>What Is DBR?</i> .....	93
4.4.3 <i>Characteristics</i> .....	94
4.4.4 <i>DBR in a Museum Setting</i> .....	95
4.4.5 <i>Rationale for a DBR approach</i> .....	96
4.4.6 <i>Challenges and limitations of DBR</i> .....	97
4.5 RESEARCH METHODS.....	98
4.5.1 <i>Qualitative approach and creative research methods</i> .....	98
4.6 DATA COLLECTION.....	101
4.6.1 <i>Sampling</i> .....	102
4.6.2 <i>Reflexivity and researcher reflections</i> .....	102
4.6.3 <i>Children’s’ daily reflections</i> .....	102
4.6.4 <i>Reflection journals</i> .....	102
4.6.5 <i>Fun toolkit</i> .....	103
4.6.6 <i>Video recordings</i> .....	103
4.6.7 <i>Children’s questionnaires</i> .....	104
4.6.8 <i>Survey methodology</i> .....	105
4.6.9 <i>Interviews and focus groups</i> .....	105
4.6.10 <i>Ethnographic observations</i> .....	106
4.7 DATA ANALYSIS.....	106
4.7.1 <i>Thematic analysis</i> .....	106
4.7.2 <i>Familiarisation with the data</i> .....	107

4.7.3 Coding methods .....	107
4.7.4 Theme development and refinement .....	111
4.7.5 FRAMES .....	111
4.7.6 Analytic memos .....	112
4.7.7 Code book .....	112
4.7.8 Transcription .....	112
4.7.9 Poetry analysis .....	113
4.7.10 Quantitative analysis of qualitative data .....	114
4.7.11 Video analysis .....	114
4.7.12 Student artefacts .....	114
4.8 ETHICAL CONSIDERATIONS .....	115
4.9 CHAPTER SUMMARY .....	117
<b>CHAPTER 5 DESIGN CYCLE ONE .....</b>	<b>118</b>
5.1 PROJECT LAYOUT - SCHOOL .....	118
5.2 FINDINGS AND DISCUSSION .....	124
5.2.1 Data Collection .....	124
5.2.2 Themes .....	128
5.2.3 Summary of findings .....	134
5.2.4 Discussion .....	135
5.2.5 Design changes resulting from school S1.1 intervention .....	138
5.3 PROJECT LAYOUT - MUSEUM .....	139
5.4 FINDINGS AND DISCUSSION .....	143
5.4.1 Data collection .....	143
5.4.2 Themes .....	147
5.4.3 Summary of the Findings .....	151
5.4.4 Discussion .....	152
5.5 FORMAL VERSUS INFORMAL LEARNING ENVIRONMENTS .....	155
5.6 PLAYFUL LEARNING INDICATORS ACROSS THE SCHOOL AND MUSEUM .....	157
5.7 DESIGN CHANGES AND MODIFICATIONS FOR DESIGN CYCLE TWO .....	160
5.8 EVOLVING DESIGN SENSITIVITIES .....	161
5.9 CHAPTER SUMMARY .....	163
<b>CHAPTER 6 DESIGN CYCLE TWO .....</b>	<b>164</b>
6.1 PRINCIPAL STUDY .....	164
6.1.1 Data collection .....	166
6.2 SCHOOL 2.3 .....	170
6.2.1 Two-Day Overview .....	171
6.2.2 Findings .....	173
6.2.3 Summary of findings .....	189
6.2.4 Design changes resulting from S2.3 intervention .....	190
6.3 SCHOOL 2.4 .....	191
6.3.1 Two-Day Overview .....	192
6.3.2 Findings .....	194
6.3.3 Summary of findings .....	209
6.3.4 Design changes resulting from S2.4 intervention .....	209
6.4 SCHOOL 2.5 .....	211
6.4.1 Two-Day Overview .....	212
6.4.2 Findings .....	213
6.4.3 Summary of findings .....	226
6.4.4 Design changes resulting from S2.5 .....	227
6.5 MUSEUM 2.6 .....	228
6.5.1 Three-Day Overview .....	229
6.5.2 Findings .....	230
6.5.3 Summary of findings .....	246
6.6 DISCUSSION ACROSS SCHOOLS AND MUSEUM .....	247
6.6.1 Development of Learningful Heritage Play .....	247

6.7 CHAPTER SUMMARY .....	261
<b>CHAPTER 7 TECHE DESIGN MODEL.....</b>	<b>262</b>
7.1 DESIGN CRITERIA.....	263
7.2 DESIGN INFORMANTS.....	269
7.3 TECHE DESIGN MODEL.....	271
7.4 ADAPTING THE MODEL.....	271
7.5 CHAPTER SUMMARY .....	272
<b>CHAPTER 8 DESIGN CYCLE THREE.....</b>	<b>273</b>
8.1 PROJECT LAYOUT.....	276
8.2 METHODOLOGY .....	278
8.3 FINDINGS.....	282
8.3.1 <i>The development of ‘place’ understandings</i> .....	282
8.3.2 <i>Materiality</i> .....	283
8.3.3 <i>Digital augmentation</i> .....	288
8.3.4 <i>Engagement</i> .....	288
8.3.5 <i>Sociality</i> .....	290
8.3.6 <i>Playful learning</i> .....	291
8.4 DISCUSSION.....	292
8.5 CHAPTER SUMMARY .....	301
<b>CHAPTER 9 SENSE OF PLACE DESIGN MODEL .....</b>	<b>302</b>
9.1 TECHE MODEL ADAPTATION .....	302
9.2 DESIGN MODEL .....	304
9.3 DESIGN INFORMANTS.....	308
9.4 FUTURE ADAPTATIONS .....	309
9.5 CHAPTER SUMMARY .....	309
<b>CHAPTER 10 CONCLUSIONS .....</b>	<b>311</b>
10.1 SUMMARY OF THESIS’ STRUCTURE.....	311
10.2 ANSWERING THE RESEARCH QUESTIONS .....	313
10.3 TECHE AND SENSE OF PLACE DESIGN MODELS.....	314
10.4 SIGNIFICANCE OF CONTRIBUTION TO RESEARCH.....	316
10.5 RECOMMENDATIONS FOR FUTURE RESEARCH IN A COVID-19 WORLD .....	319
<b>CHAPTER 11 REFERENCES .....</b>	<b>320</b>
<b>CHAPTER 12 APPENDICES .....</b>	<b>352</b>

## List of Tables

Table 1-1 Overview- Design Cycles .....	10
Table 2-1 SESE Relevant Primary school History and Geography Strands and Units .....	26
Table 2-2 Taking Part Survey UK 2018/2019 .....	32
Table 3-1 Play Qualities – Characteristics of Play from the Literature .....	80
Table 3-2 Characteristics of Engagement from the Literature .....	83
Table 4-1 Data Collection Overview .....	101
Table 4-2 Fun Sorters/Again-Again Tables - Iterations through Design Cycles .....	103
Table 4-3 Questionnaire Type Details.....	104
Table 4-4 Focus Group Statistics.....	106
Table 4-5 Coding Process Overview.....	107
Table 4-6 Coding Framework Overview.....	108
Table 4-7 DC1 First Cycle Coding Methods.....	109
Table 4-8 Second Cycle Coding Types Overview.....	110
Table 4-9 Types of Poetic Forms.....	114
Table 5-1 DC1 S1.1 Coding Methods .....	125
Table 5-2 DC1 S1.1 Again-Again Table - YES, MAYBE and NO.....	131
Table 5-3 DC1 S1.1 Ranking of Fun Sorter Activities.....	132
Table 5-4 DC1 Proposed Design Changes from S1.1 to M1.2 .....	138
Table 5-5 DC1 M1.2 Coding Methods.....	144
Table 5-6 DC1 M1.2 Ranking of Activities – Fun Sorter .....	149
Table 5-7 DC1 M1.2 Again-Again Table .....	149
Table 5-8 DC1 Summary of Themes.....	155
Table 5-9 DC1 Questionnaire (2) Comparisons – School and Museum .....	156
Table 5-10 Pedagogy of Play Indicators added to DC1 TEChE pilot project .....	158
Table 5-11 DC1 School Example (week 10) of Coding Pedagogy of Play, Playful Learning Indicators.....	158
Table 5-12 DC1 Pedagogy of Play Comparison School and Museum .....	159
Table 5-13 DC1 Evolving Design Changes DC1 to DC2 .....	161
Table 5-14 DC1 TEChE Evolving Design Sensitivities .....	162
Table 6-1 DC2 S2.3 Questionnaire - What did you learn during the project? .....	174
Table 6-2 DC2 S2.3 Did you enjoy the project? Why? Why not?.....	186
Table 6-3 DC2 S2.3 Ranking of Fun Sorter Activities.....	188
Table 6-4 DC2 S2.3 Again-Again Table.....	189
Table 6-5 DC2 Evolving Design Changes - School 2.3 to 2.4 .....	190
Table 6-6 DC2 S2.4 Questionnaire - What did you learn during the project? .....	195
Table 6-7 DC2 S2.4 Questionnaire Did you enjoy the project? Why? Why not?.....	203
Table 6-8 DC2 S2.4 Ranking of Fun Sorter Activities (1-9) .....	208
Table 6-9 DC2 S2.4 Again-Again Table.....	208
Table 6-10 DC2 Evolving design changes - School 2.4 to 2.5 .....	210
Table 6-11 DC2 S2.5 Questionnaire - What did you learn during the project? .....	214
Table 6-12 DC2 S2.5 Ranking of Fun Sorter Activities (1-9) .....	225
Table 6-13 DC2 S2.5 Again-Again Table.....	225
Table 6-14 DC2 M2.6 Questionnaire – What did you learn?.....	231
Table 6-15 DC2 M2.6 Questionnaire – What did you learn?.....	238
Table 6-16 DC2 M2.6 Sample quotes – Hardest Activity- Children's reflection journals.....	239
Table 6-17 DC2 M2.6 Questionnaire – Did you enjoy the project? .....	242
Table 6-18 DC2 M2.6 Sample quotes – Favourite Activity- Children's reflection journals .....	244
Table 6-19 DC2 M2.6 Fun Sorter - Ranking of Fun Activities .....	245
Table 6-20 DC2 M2.6 Again-Again Table .....	246
Table 6-21 DC2 'I like Working in Teams' – Comparison across All Interventions.....	251

Table 6-22 DC2 VAS Questionnaire – Comparison of Statement Responses .....	253
Table 6-23 DC2 VAS Questionnaire- Heritage is interesting.....	253
Table 6-24 DC2 Visual Data - Drawings - All Schools and Museum .....	255
Table 7-1 TEChE Design Sensitivities .....	263
Table 8-1 DC3 M3.7 Pattern code example .....	281
Table 9-1 Sense of Place Design Sensitivities .....	305
Table 10-1 Core Design Features of a Creative Learning Model for Heritage Engagement .....	315

## List of Figures

Figure 1-1 Design-Based Research Framework .....	9
Figure 1-2 Heritage Interactions Continuum .....	11
Figure 1-3 Frank Oppenheimer - Founder of the Exploratorium Museum- On display in museum.....	12
Figure 2-1 Minecraft Block .....	49
Figure 2-2 Indicators of Playful Learning: (International School of Billund 2019). Developed by Pedagogy of Play at Project Zero, Harvard Graduate School of Education. This work is licensed under Creative Commons Attribution- NonCommercial 4.0 International .....	65
Figure 2-3 Creative Learning Spiral – After Resnick 2007a .....	68
Figure 3-1 TEChE Prototype Design Model .....	71
Figure 3-2 Heritage Interactions Continuum .....	73
Figure 3-3 Model for Creativity – After Resnick 2007a, Lucas et al 2016 .....	81
Figure 4-1 Visual Analogue Scale .....	104
Figure 4-2 Coding - Transition Methods (Saldaña 2016) .....	110
Figure 5-1 DC1 S1.1 Ten-week Project Plan.....	119
Figure 5-2 DC1 S1.1 Digital Citizenship Bookmark.....	119
Figure 5-3 DC1 S1.1 iPad TEChE Folder of Apps .....	120
Figure 5-4 DC1 S1.1 Project TEChE - example of private page once user logged in.....	120
Figure 5-5 DC1 S1.1 Project TEChE- reflections audio and written .....	120
Figure 5-6 DC1 S1.1 15th Century Laws Incorporated into Minecraft.....	121
Figure 5-7 DC1 S1.1 Minecraft Free Digital Play .....	122
Figure 5-8 DC1 S1.1 Children Presenting Story Process.....	122
Figure 5-9 DC1 S1.1 Minecraft Screenshot of Chats.....	123
Figure 5-10 DC1 S1.1 FLIRT FM Recording Studio.....	123
Figure 5-12 DC1 S1.1 Minecraft Medieval Galway Images .....	124
Figure 5-11 DC1 S1.1 Showing of Minecraft Movie on Medieval Galway .....	124
Figure 5-13 DC1 S1.1 Example 1st Cycle Coding – Categorisation of Process Coding UOMs .....	126
Figure 5-14 DC1 S1.1 Visual Concept Map - 2nd Cycle Coding .....	127
Figure 5-15 DC1 S1.1 Overarching and Sub themes .....	128
Figure 5-16 DC1 S1.1 Theme Positive Affect .....	129
Figure 5-17 DC1 S1.1 Questionnaire Finding - Role of Technology Learning History .....	133
Figure 5-18 DC1 S1.1 Free Verse Poetry - children’s reflections – ‘What is fun?’ .....	137
Figure 5-19 DC1 M1.2 Education room- Galway City Museum - Photo Credit: T. Hall.....	140
Figure 5-20 DC1 M1.2 Museum –My Object Storyboard .....	142
Figure 5-21 DC1 M1.2 'Cave girl' 'Drawing and Sample Script .....	142
Figure 5-22 DC1 M1.2 L-R, Children Working in Museum Galleries - Photo Credit 1 & 3: T.Hall .....	142
Figure 5-23 DC1 M1.2 Scanning a QR Code in Museum Display Units - Photo Credit: T. Hall.....	143
Figure 5-24 DC1 M1.2 Example Coding Process - Children’s Reflections- Process & InVivo Coding Methods... 144	144
Figure 5-25 DC1 M1.2 Parents Survey 1st Cycle Coding.....	145
Figure 5-26 DC1 M1.2 Concept Map .....	146
Figure 5-27 DC1 M1.2 Children's Reflections and Parent's Survey Themes .....	147



Figure 5-28 DC1 M1.2 Fun Toolkit Museum—L-R Again-Again Table, Fun Sorter .....	148
Figure 5-29 DC1 M1.2 Word Cloud L-R Parent's Survey and Children's Reflections .....	150
Figure 5-30 DC1 M1.2 Free Verse poem - Children's Reflections - 'Not Sitting in a Seat' .....	153
Figure 5-31 DC1 Comparison of Team Attitudes .....	155
Figure 5-32 DC1 Pedagogy of Play Categories Comparison Museum and School .....	159
Figure 5-33 DC1 TEChE Evolving Design Sensitivities – At a Glance .....	163
Figure 6-1 DC2 All Schools – Two-Day project plan .....	165
Figure 6-2 DC2 S2.3 Storytelling strategies (L-R): What-if Stickies Board - How Might we? -Storyboards.....	170
Figure 6-3 DC2 S2.3 Children's Drawings and Presentations.....	171
Figure 6-4 DC2 S2.3 Two- Day Overview .....	171
Figure 6-5 DC2 S2.3 Day One -Out-of-school Learning - Local trip and Library session .....	171
Figure 6-6 DC2 S2.3 Data Capture and Classroom Set-up .....	172
Figure 6-7 DC2 S2.3 Vignette 1 - Materiality – Climbing the Motte .....	173
Figure 6-8 DC2 S2.3 Materiality - Poem - Climbing the Motte .....	175
Figure 6-9 DC2 S2.3 Vignette 2 - Materiality- Developing Pride in Place –Place-consciousness .....	176
Figure 6-10 DC2 S2.3 Vignette 3 – Digital Augmentation - Novelty of Minecraft.....	176
Figure 6-11 DC2 S2.3 Vignette 4 – Digital Augmentation - Novelty of Minecraft.....	177
Figure 6-12 DC2 S2.3 Vignette 5 – Digital Augmentation- Minecraft Issues .....	178
Figure 6-13 DC2 S2.3 Vignette 6 - Digital Augmentation- Disagreements over Technology Use .....	179
Figure 6-14 DC2 S2.3 Vignette 7 - Digital Augmentation - Wi-Fi Challenges .....	180
Figure 6-15 DC2 S2.3 Vignette 8 - Sociality - Seeking Help from Peers .....	181
Figure 6-16 DC2 S2.3 Heritage AND Technology in Children's Drawings.....	182
Figure 6-17 DC2 S2.3 Vignette 9 – Engagement - Pride.....	183
Figure 6-18 DC2 S2.3 Vignette 10 – Sociality – Collaboration Challenges .....	184
Figure 6-19 DC2 S2.3 Vignette 11 Creative Learning – Persistence.....	185
Figure 6-20 DC2 S2.3 Vignette 12 - Learningful Play .....	187
Figure 6-21 DC2 S2.3 Vignette 13 - Learningful Play .....	188
Figure 6-22 DC2 S2.4 Two-Day School Overview.....	191
Figure 6-23 DC2 S2.4 Field Trip.....	192
Figure 6-24 DC2 S2.4 How do you want to make your story? .....	192
Figure 6-25 DC2 S2.4 Data Capture and Classroom Set-up .....	193
Figure 6-26 DC2 S2.4 Materiality -Poem – A funner way to learn .....	194
Figure 6-27 DC2 S2.4 Heritage AND Technology in children's drawings .....	195
Figure 6-28 DC2 S2.4 Vignette 14 - Digital Story building- Minecraft.....	196
Figure 6-29 DC2 S2.4 Vignette 15- Minecraft details in local sites .....	197
Figure 6-30 DC2 S2.4 Vignette 16 -One boy's storyboard process .....	198
Figure 6-31 DC2 S2.4 Vignette 17 Engagement .....	199
Figure 6-32 DC2 S2.4 Vignette 18 - Flow .....	200
Figure 6-33 DC2 S2.4 Vignette 19- Flow .....	201
Figure 6-34 DC2 S2.4 Vignette 20- Sociality.....	201
Figure 6-35 DC2 S2.4 LEGO - Banquet at the castle –Photo credit: T.Hall.....	203
Figure 6-36 DC2 S2.4 Creative learning .....	203
Figure 6-37 DC2 S2.4 Vignette 21- Learningful Play .....	205
Figure 6-38 DC2 S2.4 Vignette 22 Learningful Play .....	207
Figure 6-39 DC2 S2.5 Overview .....	211
Figure 6-40 DC2 S2.5 Classroom and Data Capture Set up.....	212
Figure 6-41 DC2 S2.5 Vignette 23 Materiality - Making personal connections to place .....	213
Figure 6-42 DC2 S2.5 Technology AND Heritage in children's drawings .....	215
Figure 6-43 DC2 S2.5 Vignette 24 Engagement - Dwell Time .....	217
Figure 6-44 DC2 S2.5 Vignette 25 Engagement – Interest and Pride .....	218
Figure 6-45 DC2 S2.5 Vignette 26 - Playful Learning .....	221
Figure 6-46 DC2 S2.5 Post-it notes .....	222
Figure 6-47 DC2 S2.5 Heritage sites as harnessing children's own interest .....	222

Figure 6-48 DC2 S2.5 Vignette 27 - Learningful Play .....	224
Figure 6-49 DC2 S2.5 Vignette 28 - Learningful Play .....	225
Figure 6-50 DC2 M2.6 Overview and Methodologies.....	228
Figure 6-51 DC2 M2.6 Museum education room data capture set-up.....	229
Figure 6-52 DC2 M2.6 Hannah raises her arms and says 'freedom' when allowed roam free in the galleries..	230
Figure 6-53 DC2 M2.6 Heritage is Interesting - VAS questionnaire .....	232
Figure 6-54 DC2 M2.6 Children recording each other .....	232
Figure 6-55 DC2 M2.6 Vignette 29 - Children's final artefacts .....	235
Figure 6-56 DC2 M2.6 Vignette 30 Engagement .....	236
Figure 6-57 DC2 M2.6 Vignette 31- Engagement .....	237
Figure 6-58 DC2 M2.6 Drawings referencing Technology engagement .....	239
Figure 6-59 DC2 M2.6 Vignette 32 -Learningful Play.....	244
Figure 6-60 DC2 Learningful Heritage Play Indicators .....	247
Figure 6-61 DC2 All Schools - What does playful mean to you in your own words? .....	251
Figure 6-62 DC2 M2.6 Museum Scaffolding .....	256
Figure 6-63 DC2 S2.4 Story Writing - Drawing a Blank .....	257
Figure 6-64 DC2 S2.5 Story-writing Process.....	258
Figure 6-65 DC2 What was Playful about this Project? N=95 UOMs.....	260
Figure 7-1 Generic Model for Design Research in Education (McKenney & Reeves 2012)–with permission ....	263
Figure 7-2 TEChE Model for Heritage Engagement across Formal and Informal Settings .....	271
Figure 8-1 The Exploratorium Museum of Science, Art and Human Perception, San Francisco, U.S.A. ....	273
Figure 8-2 DC3 M3.7 Fisher Bay Observatory - Exploratorium Museum, San Francisco .....	273
Figure 8-3 DC3 M3.7 Exploratorium Museum Ethos –An Eternal Cycle of Curiosity.....	273
Figure 8-4 DC3 M3.7 The Exploratorium Explainers.....	274
Figure 8-5 DC3 M3.7 Creative Expression of Place (DNA Chromosomes) .....	274
Figure 8-6 DC3 M3.7 Weekly set-up sessions L-R: Fisher Bay Observatory, Conference room, Explainers - teenage participants.....	275
Figure 8-7 DC3 M3.7 Weekly Agenda and Working Area .....	275
Figure 8-8 DC3 M3.7 Seven-week Project Plan .....	276
Figure 8-9 DC3 M3.7 Paint Swatch Activity .....	277
Figure 8-10 DC3 M3.7 Public Presentation of Participants Works and Processes.....	278
Figure 8-11 DC3 M3.7 Visual Concept Map - Pattern Codes .....	280
Figure 8-12 DC3 M3.7 Pattern Codes Chronological Order L-R .....	281
Figure 8-13 DC3 M3.7 Timeline of Themes Emerging from the Data .....	283
Figure 8-14 DC3 M3.7 What Place Means to Young People – L-Meanings of Young People’s Final Art Pieces, R-Meanings of Young People’s Final Art Pieces Added to Other Forms of Data .....	288
Figure 8-15 DC3 M3.7 Process of a Participant’s Blank Page to a Finished Art Piece.....	298
Figure 9-1 Sense of Place Design Model.....	307
Figure 10-1 Design Models on a Heritage Continuum.....	316
Figure 10-2 Adaptation of McKenney & Visscher-Voerman 2013 Design Research Model .....	317

## List of Acronyms and Abbreviations

APPS	Applications
DBR	Design-Based Research
DC1	Design Cycle One
DC2	Design Cycle Two
DC3	Design Cycle Three
DS	Design Sensitivities
DST	Digital Storytelling
HCI	Human-Computer Interaction
ICOM	International Council of Museums
ICT	Information and Communication Technologies
LGBT	Lesbian Gay Bisexual Transgender
M1.2	Design Cycle One – Museum Intervention Identification Number
M2.6	Design Cycle Two – Museum Intervention Identification Number
M3.7	Design Cycle Three – Museum Intervention Identification Number
MIT	Massachusetts Institute of Technology
NUI, Galway	National University of Ireland, Galway
POP	Pedagogy of Play
S1.1	Design Cycle One – School Intervention Identification Number
S2.3	Design Cycle Two – School Intervention Identification Number
S2.4	Design Cycle Two – School Intervention Identification Number
S2.5	Design Cycle Two – School Intervention Identification Number
SE	Significant Event
SESE	Social, Environmental and Scientific Education
SOP	Sense of Place
STEM	Science, Technology, Engineering, Mathematics
STEAM	Science, Technology, Engineering, Arts, Mathematics
TEChE	Technology-enhanced Cultural Heritage Education
UNESCO	United Nations Educational, Scientific and Cultural Organisation
UOM	Units of Meaning
VAS	Visual Analogue Scale

## Chapter 1 Introduction to the Research

This opening chapter details the background for this research and the rationale for its existence. Firstly I describe the significance of heritage and place and its current position in Irish education, followed by outlining the importance of engagement and experience to heritage. The following section introduces the concept of learningful play as an approach to encourage and enhance young people's engagement with heritage. The chapter subsequently describes the affordances of technology and digital storytelling to encourage young people to engage with heritage and place. This is followed by a brief overview of the methodology and theoretical foundations. I then present the research questions. The primary question is "How can we optimally design for children's engagement with cultural heritage using technologies across formal and informal learning environments?" Finally, the chapter details are outlined as well as a brief overview of the ethical considerations for this research.

### 1.1 Researcher Rationale

All research starts from a person's worldview which is shaped by their lived experiences and which they bring to the research process (Grix 2004). My professional background and lived experiences have had an impact on this study. I hold a degree in Archaeology and Information Technology and have always been interested in heritage and technology. As a visual artist and published poet, my artistic self can lean towards romanticism and idealism. However, I am also a pragmatic person. My technical and analytic training have given me a scientific, practical edge.

The core of this thesis is born from my belief that there is a need for all children to develop an awareness and understanding of, and make connections to, their local heritage and place; to make connections to each other; to engage with their heritage and that of other people; to break down barriers and ultimately live together peacefully in their place. I believe that a creative, playful local approach is the way forward to motivate and spark interest and curiosity in children about heritage. When children enjoy learning and have fun doing so, positive affect is embodied. Therefore joy and delight are associated with the educational subject matter. When children make their own meaning, not one imposed upon them by a curriculum, or a dominant heritage narrative, children become empowered, build cultural and social capital, and build on their capacity for heritage learning and engagement. Perhaps it may be too early for children to understand the value of heritage and place to their lives, but a seed of awareness can be sown.

During my M.A. in Digital Media I explored heritage and education by co-creating eLearning heritage (archaeological) resources based on the primary school history curriculum with seven local children. I became interested in participatory research and children having a voice and being listened

to. It was important that their views were taken into consideration. In this study I explored whether creative interactive technologies could be used to enhance children's awareness of their surroundings, places they may take for granted. Could technology be used as a tool to reveal meanings in children's lived experiences or is technology necessary to engage with one's heritage and place? Whereas there is an argument for the advantages and disadvantages of technology use for children and youth, I saw an opportunity for simple easy to use technologies, and especially digital storytelling (DST), to develop children's sense of place, sense of belonging, wonder and engagement with their place. Equally I wanted to know if learning through current Irish school curriculum actually engages children with heritage? Can museums do more to engage children with local heritage? My personal curiosities on how to engage children led to this exploratory research.

### 1.1.1 The Importance of Heritage Education

Heritage is all around us. It is a part of who we are but it is complex and it is a difficult term to interpret. Heritage means different things to different people. It can be tangible as in castles, monuments, museum objects or it can be intangible as in a living heritage, or what has been passed down to us from the past such as music, dance and stories. Heritage, although associated with the past, serves our present day needs and shapes our futures. We make heritage in our everyday lives through making connections, dialogue and developing mutual understandings. Interacting with our local place, everyday interactions with others, these are what Newman (2015) calls living in the detail, not in the larger picture which does not afford genuine belonging or authentic homesteads. Heritage and place are very much intertwined. At the core of the Heritage Council of Ireland's policies and programmes are a focus on the relationship between people and place (Burke et al. 2017). We live in a world full of challenges and uncertainties including climate change, migration, social inequalities (Doering and Henrickson 2015, Somerville et al. 2009) environmental issues (Smith & Sobel 2010b) and we are currently living through a global pandemic. If we develop an intimate knowledge and attachment to our local place (Somerville et al. 2009) we will care for our place, become active citizens and develop democratic mindsets (Gruenewald, D. A. and Smith, G.A. 2008, Smith and Sobel 2010b). If we do not develop 'rootedness' in place we risk the destruction of our communities (Orr 2013). As social human beings, we need interaction with other people to lead our own productive lives. Heritage-making and place-making allow us to develop a sense of our place and foster identity, belonging, wellbeing, and in making sense of our lives. Heritage and place-making can mediate between people to achieve simpler, more equitable living practices. Chapter two explores the concept of heritage and place in more detail.

### 1.1.2 Heritage Education in Schools and Museums

Education has been traditionally associated with institutions, such as schools or museums. Children's main interactions with local heritage (if any) usually take place in school, in a museum or heritage centre, either on their own or with family or friends. Schools provide the curriculum framework and museums provide many learning opportunities for school children through field trips as well as providing additional public learning programmes. Heritage covers many disciplines but in the official school curriculum in Ireland it forms part of the SESE curriculum, which covers the subjects History, Geography and Science. Education is the core mission of the museum and it is rapidly changing since the past few decades. Where once museum audiences were elitist the educational role has changed to incorporate diverse audiences and different learning styles (Hein 2014).

Within this thesis, my focus is on learning rather than education. Education can be understood as organised, deliberate, intentional and purposeful learning (UNESCO 2015). Both formal (school) and non-formal (museum) education suggests institutionalisation; 'formal' education in schools is subject to standardised curriculum, testing and assessment, and museum education although less structured provides learning resources to complement formal school curriculum (Bellamy and Oppenheim 2009). Learning also happens in informal spontaneous ways. Many children learn outside of schools, in the home or through everyday experiences in their environment (Csikszentmihalyi and Hermanson 1995).

There are certain points of tension between the ideas of education versus that of learning. One such tension is the concept of 'edutainment' (a combination of education and entertainment). Edutainment software (products created by external companies) are marketed to parents, schools and teachers. Educators have voiced concern regarding their use as children can become passive recipients of other's idea of learning, not active participants in their own learning (Resnick 2004). Museum learning has been characterised as edutainment; consequently it has been separated from museum education and formal school education (Hooper-Greenhill 2007). However, not only do museums offer schools valuable in-house learning and curriculum learning resources, they also offer ways of learning that are exciting, foster creativity and inspire wonder within their own institutions (Bellamy and Oppenheim 2009).

Although fun and enjoyment are not normally associated with education and learning both concepts of 'fun' and 'learning' can work well together in the context of the museum (Falk and Dierking 2013, Hooper-Greenhill 2007). Museums are finding it difficult to attract and retain new audiences (Dindler et al. 2010) which will be a continuing cause of concern for museums during and after the Covid-19 global pandemic of 2020. Some museums such as the Manchester Museum have embraced play-based strategies to make their museum more playful which brought its own challenges and tensions (Lester et al. 2014). There are also tensions in schools around play and playful learning. Play can be seen as frivolous and not conducive to learning (Caillois 1958:2001). 'Play' is considered a

problematic word in the context of formal school learning (Sahlberg and Doyle 2019). The intellectual ideal is a balance between seriousness and playfulness (Dewey 1910, p. 219). The proposed playful learning design in this thesis, combining fun and learning, and where children are active participants in the learning process rather than passive recipients (Resnick 2004) is a learning approach that can cross the learning environments of the school and museum.

### 1.2 Children's Engagement with Heritage

#### 1.2.1 What is Engagement?

Mihalyi Csikszentmihalyi originally conceived of 'Flow' as a theoretical concept in 1975. A flow experience means a person is absorbed in a task that is intrinsically enjoyable, where the task at hand is neither too easy nor too difficult for the person's skillset (Csikszentmihalyi 2014a). It is like the person is 'in the zone' or some have described it as being visited by a muse (Csikszentmihalyi 2014b). Flow is a deep engagement with a task. Whereas educators cannot make flow happen, they can create conditions for flow-producing learning experiences (Csikszentmihalyi and Hermanson 1995).

Csikszentmihalyi was asked in an interview what curriculum subjects lend themselves to more engagement than others. He replied history was found to be the worst curriculum subject for engagement, and any subject with computers was rated highly (Csikszentmihalyi 2014c). Therefore, this study has an opportunity to improve engagement levels with history and heritage through creating the conditions for flow experiences that will subsequently engage the child with the subject matter. To experience flow young people must be motivated and want to learn. Flow experiences afford optimal pleasure in learning, and this is more likely when a person is motivated (Csikszentmihalyi and Hermanson 1995). When focused concentration on a task and positive affect come together to motivate children intrinsically (Csikszentmihalyi 2014b), children want to do the task or activity because they are interested in, and feel energised or satisfied by the challenge (Ryan and Deci 2000). The intrinsic motivation inherent in a flow experience is what affords the learner's engagement with the activity or subject matter. Equally, when children are intrinsically motivated to learn and there is high positive affect, conditions for creativity are high (Amabile 1990, Csikszentmihalyi 1975).

Engagement, play, creativity and learning are all interrelated. When students are involved in play, when flow is happening and learners are 'carried away' with their activities or subject matter, deep learning is happening (Csikszentmihalyi 1990, Csikszentmihalyi and Hermanson 1995). The literature has shown play equates to learning (Bruner 1986, Singer et al. 2006) equates to creativity and creative learning (Russ 1993, Sefton-Green et al. 2011) all which equates to engagement (Rice 2009).

### 1.2.2 “The Experience is Everything”

Experiential learning is a philosophy of education based on Dewey’s (1938) theory of experience (Kolb and Kolb 2005). It has been defined by Kolb as a process of knowledge creation through the transformation of experience (1984). Learning to Dewey was experiential and situated. He believed curiosity, active exploration with real-life materials and interacting with one’s environment was how children learned best. Dewey believed education should include children’s everyday experiences as “every experience is a moving force” (Dewey 1938, p.38). Harnessing children’s everyday engagement makes a learning experience memorable for children, and a memorable educational experience becomes joyful, enriching and transformational (Shneiderman 1998).

Increasingly in schools, thought and action have been separated, knowledge is abstract, not experiential, and the significance of experience-based learning has not been recognised (Hansen 2000). In the process of going from the concrete (experience) to the abstract (knowledge) children can develop greater interest in, and make added connections with, the experience activity (Dewey 1910); through a learning experience children can understand larger global issues through interaction with one’s smaller ‘local’ place (Plymouth 1933). Through interacting with one’s local place, experiential learning helps children better understand themselves, others and the world around them.

The pedagogic design explored in this thesis provides physical experiential interaction, activities, resources and scaffolding for children to become aware of, understand, and deeply engage with cultural heritage and place. Through supporting and connecting to children’s everyday lived experiences it is possible that children will have a different outlook on heritage. It is hoped children would display intellectual curiosity about material culture i.e. heritage sites, monuments and/or museum objects, find value in their local, and develop positive attitudes, values and interest in cultural heritage that may or may not manifest until sometime in the future. Positive learning experiences afford children joy in learning, initiating wonder and sparking their imaginations. Positive learning experiences allows children to make meaning and sense of previous knowledge, and allows for social interaction, togetherness and making connections. Through the use of technology children can articulate, through the making of digital artefacts, that which may be difficult to articulate; they find a way to give their feelings form about place (Tuan 1977) whether that is through art, writing or song.

Each learning experience with cultural heritage becomes a building block (Stocklmayer and Gilbert 2002), a ‘staging post’ on an individual’s learning journey (Sefton-Green 2013) and serves as a “set of reminders’ for further experiential learning (Stocklmayer and Gilbert 2002). Positive experiences are key to engagement as Stocklmayer and Gilbert (2002) have found in their research with science museums. Indeed, they give a clear message – “the experience is everything” (p.856). Everything depends upon the quality of experience which the children have (Dewey 1938).



### 1.3 Learningful Play as an Approach to Heritage Engagement

In the context of this thesis, I am defining learningful play as learning through play while using technology; this combination of technology and playful learning allows for playful exploration, experimentation, design and the nurturing and extension of children's creative abilities (Resnick 2006). Resnick (2006) calls for technologies to support new approaches to education which is particularly relevant in this current climate of a global pandemic as schools and museums face recurring closures. Technology can enhance learning and engagement with heritage. It can be perceived as a 'paintbrush', as a tool for creative expression rather than for passive consumption (Resnick 2006). This is important for children as young people need to think and act creatively as we move towards a creative society (Resnick 2017). However, not all technology can foster creativity in children. If a technology-enhanced learning intervention positively supports experimentation, exploration and expression then children can develop as creative thinkers (Resnick 2017). Learningful play with its playful approach to learning creates the necessary conditions to foster creativity, flow and interest in subject matter. Heritage education can be enhanced by integrating learningful play approaches, i.e. playful practices and effective educational technologies. A learningful play experience and setting must be playful, enjoyable and take place with others. Without the combination of these features, a learning environment with playful learning intentions will not work. Therefore, in this thesis learningful play can be deemed enjoyable learning encounters and experiences with others within an authentic playful learning environment that fosters inquiry and creativity while using technology. Learningful play underpins the study's developing *TECHe* (Technology-enhanced Cultural Heritage Education) pedagogic model to support children's engagement with heritage.

#### 1.3.1 Harnessing Children's Everyday Use of Technology for Learning

Digital technologies are transforming learning and offer learning opportunities to everyone. Within technology-enhanced learning environments and with support from educators/facilitators there are opportunities for children to engage deeply with subject matter as well as develop important digital literacy skills. In this study, free easy to use applications (apps) were employed, ones that some children were familiar with outside of school. Harnessing their everyday engagement with digital technologies, e.g. the video game *Minecraft*, provided opportunities to explore the affordances of these technologies in the form of storytelling in the classroom and museum. There are few examples of learning through *Minecraft* in schools yet the game is steeped in nineteenth century pedagogies, notably those of Pestalozzi, Froebel, and Montessori who have contributed to current knowledge on

the interrelationships between play, building (constructing, making) and learning (Fanning and Mir 2014).

### 1.3.2 Education and Technology in the Covid-19 Pandemic

Many people have concerns about children's use of technology, which are outlined in the literature review chapter and now with the Covid-19 pandemic, life is becoming 'digital by default' (Livingstone 2020). Primary school education may be changed forever as a result of Covid-19 pandemic (Burke and Dempsey 2020, Hall et al. 2020). With the closure of schools during this global pandemic, parents, children and teachers are finding home schooling challenging. The digital divide (Burke and Dempsey 2020, Hall et al. 2020) and digital use divide are concerns of educators in Ireland's schools (Hall et al. 2020). Whereas technologies may be available for use, not everyone is skilled in their use. Many schools are replacing traditional teaching methods with the same practices online (Hall et al. 2020) when there are opportunities for new innovations in educational practices. Selwyn and Jandrić (2020) state Ed Tech (educational and technological practices to enhance learning) in this pandemic has been 'a mess'. Schools and teachers are trying their best to cope with technological challenges such as Wi-Fi access levels (if any) for different students (Selwyn and Jandrić 2020) and the problem of working digital equipment for students. Museums and informal learning centres are also faced with difficult decisions as a result of the current global pandemic. In the future museums will have to change their learning strategies in order to engage with all their audiences, and especially children who may be learning from home while in lockdown. This means parents and guardians will require guidance in order to scaffold their children in museum and home learning.

This paradigm shift to blended online home learning provides an opportunity to promote new authentic interactivity in classrooms (Hall et al. 2020) and in the museum setting. There is an urgent need to support the development of children's digital skills or they are at risk of being left behind. Whereas the focus in this study is on engagement rather than the development of digital competencies, this study's design model will add to children's digital skill set. However my main purpose in constructing this design model is to provide a tool to engage young people with their heritage.

### 1.3.3 Digital Storytelling

Given the centrality of storytelling to people's lives, it is not surprising to find digital storytelling is of interest to educators (Ohler 2006). Digital storytelling (DST) is collaborative and a social process and has become a particularly powerful technology tool for classroom activities (Graham and Liguori 2019) and classroom engagement (Lambert 2012). I employ DST in this research as a tool for children to create original digital stories/artefacts that allow them make meaning with heritage and deepen their

engagement with their place. Digital stories are normally two to three minutes in length and are composed of narrative, images, art, music, video game screenshots and voiceovers. The finished artefact is either a short video, digital comic or an animation. Research has found evidence that the DST process has an impact on student's motivation, learning, engagement (Barrett 2006) and creativity (Garzotto et al. 2010, Ioannidis et al. 2013, Tackvic 2012). The DST process in this research aims for deeper engagement with heritage and place. Play-based approaches can be applied to heritage education through a digital creative storytelling process, one where all children create digital meaningful artefacts. In the process the children develop an awareness of, understanding of, and interest in heritage. DST is detailed later in this thesis in the literature review section.

### 1.4 Research Questions, Objectives and Methodology

This study aims to determine if constructionist technologies (technologies to make, build or create with) can impact engagement with heritage. By facilitating children through an iterative creative and playful learning process in the naturalistic contexts of formal school classrooms and the informal setting of a museum, I envisage that a pedagogic model can be designed to be adapted and adopted by others such as heritage and educational practitioners. Therefore this research addresses three interrelated questions: one main question and two supporting questions. The primary question asks: **How can we optimally design for children's engagement with cultural heritage using technologies across formal and informal learning environments?** The supporting questions help answer the main question: (a) what is the potential of play-based approaches to enhance heritage and place engagement across informal and formal learning environments? and (b) what are the core design features of a creative learning model for heritage engagement?

Design-based research, as carried out in this research is of an exploratory nature and consequently research questions should be open and emanate from the research problem (Herrington et al. 2007). As the concept of enhancing engagement is core to this research study, the research sets out to understand how children interact with heritage, how engagement manifests itself in current educational practices, and whether there are differences in the classroom and museum. Following a social constructivist and constructionist approach, this thesis aims to identify features of a successful creative heritage learning and engagement model that crosses both formal and informal learning environments.

#### 1.4.1 Brief Summary of Methodology, Contribution and Theoretical Framework

The overarching methodology in this research is design-based research (DBR). DBR aims to bring together both theory and practice (Barab and Squire 2004). DBR is defined as

## Chapter One Introduction

a systematic but flexible methodology aimed to improve educational practices through iterative analysis, design, development, and implementation, based on collaboration among researchers and practitioners in real-world settings, and leading to contextually-sensitive design principles and theories

(Wang and Hannafin 2005, p.6)

In this thesis, DBR is carried out in the real-world natural settings of the classroom and the museum (Fig. 1.1). The thesis develops both theory and practice which results in a design prototype model, and a set of design sensitivities that are adaptable to other learning contexts. This thesis fills a gap in the scholarship on DBR. Central to DBR is the sharing of educational design models. However, there is a research-practice gap because projects and the models they produce rarely 'live on past the lifecycle of single projects' (McKenney and Schunn 2018, p. 2). The design model in this thesis is adapted in an international setting as part of this research which results in another prototype design model and another set of design sensitivities. The research is supported by a multi-ontological framework that draws on the theories of constructivist and constructionist learning.

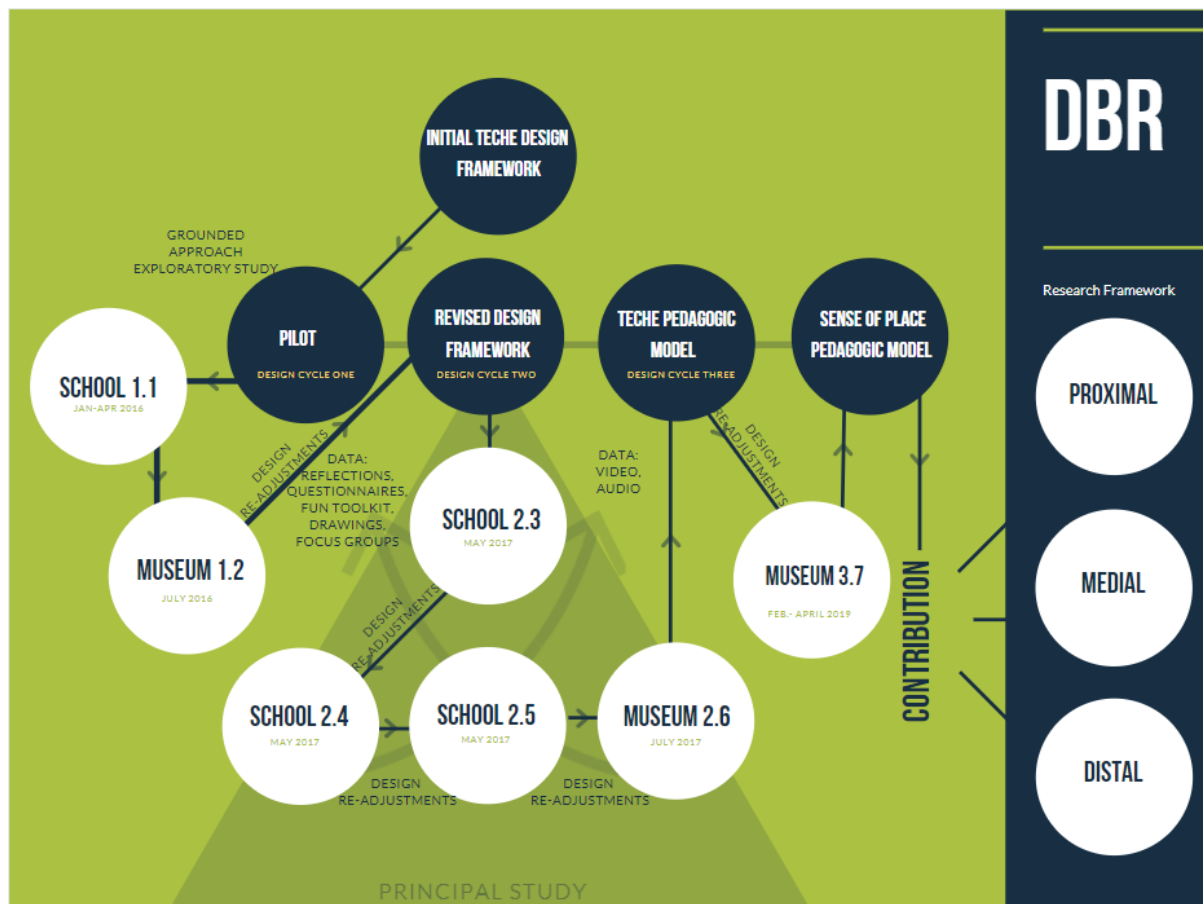


Figure 1-1 Design-Based Research Framework

## 1.4.2 General Overview of The Research Design

This research evolved over four years. The research was carried out over three cycles of design, the first two carried out with primary school children aged 10-13 in schools and a museum, the third in an international museum with teenage youth (Table 1.1). In Design Cycle One (DC1), the exploratory pilot study began with a ten-week intervention (2 hours weekly) in a city school. In a following museum intervention I implemented design changes and improvements from the school intervention, flexibility and adaptability being central to the DBR process. After analysis of DC1, emerging theoretical concepts were applied to the design of Design Cycle Two (DC2) which is carried out in three schools and one museum. A set of adaptable design principles or sensitivities (Ciolfi and Bannon 2003) for a heritage engagement model emerge from this cycle. Both DC1 and DC2 interventions are based on the Irish school Social Environmental and Scientific Education (SESE) curriculum for 5<sup>th</sup> and 6<sup>th</sup> classes (NCCA 1999). Heritage and place come under the umbrella of the subjects of History and Geography. This study's main curriculum interest is the discipline of history and specifically its curriculum unit 'local history'. However, it also draws on the curriculum areas of geography, art, English, and ICT. Design Cycle Three (DC3) is somewhat of an outlier, but adheres to the ethos and principles of this thesis. It was carried out in an international museum within a significantly different learning context. Therefore, the existing design model (*TEChE*) was adapted and localised to the context of the museum and for the teenage volunteer participants. This resulted in a new prototype design model (*Sense of Place*) and set of design sensitivities, design guidelines and design informants. These are detailed in chapters seven and nine respectively.

Table 1-1 Overview- Design Cycles

Phase	Number of Children and School/ Museum ID	School Museum	Dates	Ages of children	Technology used by children
DC1	School (S1.1) N=22 Museum (M1.2) N=14	City School City Museum	Jan. to April 2016 - 2 hours weekly x 10 - 10-2.30 p.m. x 4 days	10-13	iPads
DC2	S2.3 (N=23) S2.4 (N=22) S2.5 (N=30) Museum (M2.6) N=12	Rural School, Town Boys School Town Girls School City Museum	May -July 2017 - 2 school days (9.30 - 3.00 pm) - 10-2.30 p.m. x 3 days	10-13	iPads, Handheld cameras
DC3	Museum (M3.7) N=8	International Museum	February - April 2019	15-18	Paper and pen, cell phones
Total Participants - N=131. School N=97, Museum N=34					

### 1.4.3 Scope and Context

The core aim of this Ph.D. research is to explore how best to engage young people with heritage. Heritage is complicated and difficult to define. As discussed later place and heritage are intertwined. The three design cycles can be mapped on a continuum of heritage interactions (Fig. 1.2). The first two design cycles (DC1 and DC2) were positioned towards the material (tangible, sites monuments, objects) end of the continuum, whereas design cycle three (DC3) was positioned towards the dialogic (intangible, constructivist, meaning making) end of the continuum. For example, a school may position itself at the material end to satisfy its curriculum goals, equally a museum may do so and employ objects as a starting point for interacting with heritage. However, a museum is not obliged to link to curriculum in any heritage learning programs. Therefore, a museum can locate its heritage interactions on the more dialogic, intangible end of the continuum. All interactions along this continuum are context dependant. These concepts are discussed further in the literature review and the relevant design chapters.

The focus of the first two design cycles (DC1 and DC2) is interdisciplinary. I focus on cultural heritage within both the school and museum settings, largely drawing on an archaeological perspective; people from the past, cultural sites, tangible and intangible heritage. In the final design cycle (DC3), the focus is on place, and a dialogic learning approach. Although environmental or natural heritage can also include place, these domains are outside the scope of this thesis.



Figure 1-2 Heritage Interactions Continuum

### 1.4.4 Fulbright-Creative Ireland Museum Fellowship 2018-2019

Design Cycle Three (DC3) was carried out at Exploratorium Museum of Science, Art and Human Perception in San Francisco, U.S. A. This came about because I was awarded a *Fulbright-Creative Ireland Museum Fellowship* award in 2018. The Fulbright programme, sponsored by the U.S. Department of State's Bureau of Educational and Cultural Affairs allows students, scholars and professional study or carry out research in 155 countries worldwide. The Fulbright award is a highly esteemed global scholarship with a vision of enhancing intercultural understanding between people worldwide through nurturing academic and professional excellence, expertise and leadership. The founder of the programme Mr. J. William Fulbright passionately stood for values such as empathy, compassion, and mutual understanding. These characteristics must be carried forward, preserved and fought for in these divisive and fraught times. I was the first awardee of this new Fulbright programme

award which was sponsored by Creative Ireland. The Creative Ireland programme promotes creativity and well-being and aims to inspire and transform people, places and communities through creativity (Creative Ireland 2017a). The award acknowledged my doctoral work of creative engagement with youth in schools and museums. My practice and philosophy is in line with the Creative Ireland ethos of fostering creativity because of its positive impact on individuals, communities and national well-being (Creative Ireland 2017b).

The award meant DC3 could be carried out at the world-renowned institution, the

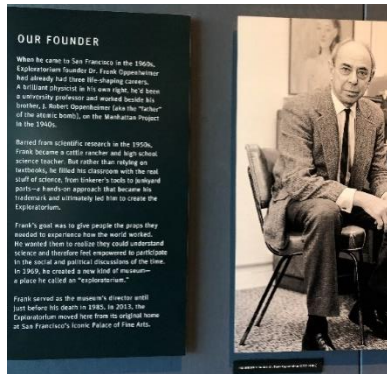


Figure 1-3 Frank Oppenheimer - Founder of the Exploratorium Museum- On display in museum

Exploratorium Museum of Science, Art and Human Perception. The founder of the museum Frank Oppenheimer, was a physicist who wanted to engage people's curiosity in science (Fig. 1.3). He passionately believed in 'learning through doing' to foster a relationship with science. He also believed learning should be fun and interactive. As a classically trained flautist and with an interest in painting, Oppenheimer had a deep appreciation of the arts. He believed art and science are closely connected. Therefore the ethos of the museum became one where both art and science

were equally valued (Cole 2009). His vision for the museum was to develop human awareness within a playful experimental setting, fostering joy and wonder and changing how people learn about science (Cole 2009). He set out to make the museum as 'kind' as possible, not allowing games as they were competitive, carefully wording the exhibits so as not to put visitors on the spot (Cole 2009). An exhibit would say 'Notice the colors' rather than 'What do you see?' (Cole 2009). He set out to make the museum not too 'sciencey', art not too 'precious', and the technology not too impersonal (Cole 2009). Today, Oppenheimer's vision is very much alive in the day-to-day working environment of the museum which now holds 650 interactive exhibits. The museum with its aim of transformative learning and developing critical and creative thinkers (Exploratorium Museum 2019c) was an ideal venue for the DC3 phase of my research.

#### 1.4.5 Ethical Considerations

The research in this thesis draws on the ethical guidelines from the British Educational Research Association (BERA 2011) as well as guidance from the Research Ethics Committee at NUI Galway. Parents, children, teachers, principals and museum educators were given flyers and information sheets before they consented to the research. Additionally, the project was explained to children in advance and they were informed the research was voluntary. There was no obligation for children to participate, and they could leave at any time without penalty or judgement. Information letters detailed confidentiality, use of video and audio recordings and details of data storage. In the writing

of the thesis, participants' names and genders have been changed. Additionally, I gave schools identification numbers (e.g. S2.3 means third school in design cycle two) so as to protect the privacy of all participants. Due to the possible open online availability of this thesis in the future, any images presented of children include blurred faces so as to protect their future privacy. Ethical procedures are further detailed in the chapter four where I outline my methodology.

### 1.4.6 Outline of Chapters

In this introduction chapter I give an overview of the thesis as well as the rationale for the research and the research questions.

Chapter two reviews the literature relevant to this study. The review is divided into two sections: heritage and place, and learningful play. The first section outlines the complexities of heritage and place and current debates in the field. The second part reviews the relevant literature for learningful play focusing on playful learning and technology. The purpose of the literature review was to examine existing heritage learning practices and programmes and what an effective design might entail. The review also ascertained whether learningful play can create new possibilities for heritage engagement.

Chapter three outlines the conceptual framework for the *TEChE* (Technology-enhanced Cultural Heritage Education) design. This is followed by the learning theories that form the multi-ontological framework for this research.

Chapter four presents the methodology and the rationale for Design-based research. The origins and development of DBR as an educational research paradigm are detailed. Data collection and analysis methods are included in this chapter as well as outlining the ethical considerations of this research.

Chapter five and six detail the first two design cycles respectively, Design Cycle One (DC1) and Design Cycle Two (DC2). These describe the implementation of the *TEChE* pedagogical framework. These two cycles, the pilot and the principal study detail the iterative processes of understanding how best to engage children with their local heritage.

Chapter seven details the prototype design model *TEChE* for heritage learning and engagement across both school and museum. It sets out design guidelines and informants to enable other educators to adapt the model to their own learning contexts.

Chapter eight details Design Cycle Three (DC3) which was carried out in an international museum context. The *TEChE* model was adapted to this significantly different learning context. The cycle aimed to understand the process of teenagers' understandings of place in the context of a city museum.

Chapter nine outlines the prototype design model *Sense of Place*. This model was adapted from the *TEChE* model. It sets out a set of design guidelines and design informants for other educators in how best to engage young people with place from the confines of a museum.



Chapter ten provides a summary and discussion of the results and conclusions. It clarifies the contribution of learningful play to enhancing children's engagement with heritage. The chapter addresses the research questions and the study's contribution to knowledge and practice. The design models, the key contributions of the research are discussed in the context of engaging young people with heritage and place. Finally, recommendations for further studies are outlined.

### 1.5 Chapter Summary

This chapter outlines the rationale and structure of the research. The chapter introduces the current state of heritage education, outlines what is happening in schools and museums and explores the effect the current pandemic may have on education. It explores the concept of experience and its relationship to engagement. The chapter considers the role of learningful play (learning, technology & play) in the design of a pedagogic model (*TEChE*) to support children's engagement with cultural heritage. DST affords children the opportunity to connect with heritage while making digital artefacts. The combination of theory and practice central to DBR highlights the need for new playful and creative ways of place-making and making heritage in the field of heritage education. An overview of the research design, the context and narrative, scope, ethical considerations and the research questions are detailed.

The following chapter is the literature review. The review of literature in the field of heritage and learningful play shapes the *TEChE* design model in its aim to enhance children's engagement with cultural heritage.

## Chapter 2 Literature Review

This chapter is divided into two main parts. Firstly, the chapter begins by introducing the complexity of heritage and place and the difficulties with definitions. Heritage and place, as concepts, are fluid, changing, evolving and dynamic processes. The literature shows a range of perspectives and discourse on what constitutes heritage. The relationship between heritage and place are laid out and the importance for people of, and the consequences for not developing a sense of place are outlined. The relationship of meaning making, belonging and identity are discussed as is what constitutes heritage in terms of values, embedded and contested. The paradigm shift in heritage understandings from the more traditional monuments, sites, artefacts etc to a more social construction of heritage is noted in the literature. Debates in the field are outlined and a position taken for those arguments in this thesis. This section provides context for understandings of heritage used throughout the thesis, what heritage is, the purpose, benefits and impacts of engaging with heritage. Examples of practices in museum and schools are detailed and novel ways of interacting with heritage. Finally, the first part of the literature review outlines playful approaches to heritage education in schools and museums. The overall section gives a background to what constitutes heritage from the perspective I, as the researcher practiced within the thesis.

Secondly, the literature covering learningful play is outlined. This literature is sub-divided into two main sections: technology, and play. Technology covers the role of technology in children's lives, its challenges and benefits. The maker philosophy of constructionism runs through the digital making, Minecraft and DST literature. Play and creativity literature are discussed as vital cogs in the learningful play wheel.

### 2.1 Section One -Heritage and Place

#### 2.1.1 Working definitions

There are many understandings of what heritage is and what it is not, as can be noted in this chapter. Today many of the distinctions between natural and cultural heritage, and tangible and intangible have blurred (Smith 2006). In Ireland, both cultural and natural heritage are part of the brief of the Heritage Council of Ireland whereas in the UK there are separate public bodies for each: English Heritage and Historic England (cultural), and Natural England (natural). To clarify understandings for this thesis working definitions for this thesis related to Heritage and place can be found at (Appendix A).

### 2.1.2 Concept of heritage

The word 'heritage' has no unitary simple meaning (Harvey 2001, Solli et al. 2011, Waterton et al. 2006). It is a 'broad and slippery term' and is used to sell houses, to food, to bars of soap (Harrison 2013) or to rusty spoons recovered from the Titanic (Solli et al. 2011). Heritage is often thought of as old monuments, buildings, artefacts, places and aesthetically pleasing sites (Smith 2006) but to limit ourselves to similar descriptions is to misunderstand the nature of heritage (Schofield 2015). A Council of Europe publication, the *Faro convention on the Value of Cultural Heritage for Society* (Council of Europe 2005) outlines the academic and intellectual concept of heritage; one that moves far beyond traditional concept of historic sites and old buildings, yet this concept is underdeveloped in local, national, regional cultural heritage strategies (Palmer 2009, p. 7). Rather than material buildings, artefacts and sites, developing shifts are towards, heritage as something 'vital and alive' (Smith 2006), something we 'do', a verb rather than a noun (Staiff 2014), towards democratisation and vernacular heritage (Robertson 2012) and a *living heritage practice* (Giaccardi and Palen 2008). The term 'heritage' is often used to describe principles and values related to the past yet the study of heritage does not involve direct engagement with the past (Harrison 2013). There is general consensus that heritage is to do with making sense of the present through what's handed down to us from the past and what continues on into the future (Fairclough et al. 2008, Heritage council of Ireland 2017, Palmer 2005, Staiff 2014) although this definition is not generally in the public understanding. From a 2015 Irish survey heritage is understood as the history of Ireland and our culture (Sloane 2015). As a society we define what heritage is. We work out what is important to us and we make decisions, based on our present day demands on what is worth preserving, saving and what can be modified or discarded (Fairclough 2009a, Graham and Howard 2008, Newman 2015, The Heritage Council 2015, Watson et al. 2019). This includes selection and discarding of heritage resources, interpretations, content and representations (Graham and Howard 2008). Meanings, sense of place, values, collective memories, identities, all are subject to rejection, regulation, and contested (Smith 2006). Our lived experiences influence this process (Carman 2002) which is fluid and dynamic (LeBlanc 1993, Newman 2015, Staiff 2014, Stokowski 2002). The process of heritage involves continual creation and transformation, with the addition of new ideas to old ideas and modifications and enhancements (Palmer 2009). It is evident from the literature that there is not one thing that is heritage but a multitude of concepts in their own right.

### 2.1.3 Concept of place

Similar to heritage the concept of place is fluid, ever-changing, dynamic (Fairclough 2009b), interdisciplinary, and is difficult to define (Cresswell 2015). It is intertwined with heritage in that heritage can be described as being both people (LeBlanc 2010, Robertson 2012) and place focused (Fairclough 2009b). There are connections and attachments between place and people (Cresswell

2015) and this relationship between people and place is at the core of the ethos of the Heritage Council of Ireland (Burke et al. 2017). The literature defines place as a location (Hay 1998), a physical setting that people orient their lives around (Stokowski 2002), a landscape (Gruenewald 2003, Newman 2009), a region, a cultural space (Gruenewald 2003), or of a spiritual (Menin 2003) and sacred nature (Basso 1996, Berleant 2003). It can be of an 'experiential notion' combining human experiences and activities in a physical setting (Ciolfi and Bannon 2005). As places too are the settings for the events of human living (Berleant 2003, p. 14), they define our human experience (Schofield 2015) and are as much a part of us as we are of them (Basso 1996, Menin 2003). Places mediate between the world and us, and through them we make sense of the world (Unwin 2003) and experiences (Cresswell 2015). Place-making helps us make sense of ourselves others and the world. It is an integral part of heritage. Place should not be thought of just as a location or a thing, but a way of seeing, understanding and knowing the world (Cresswell 2015).

### 2.1.4 Developing a sense of place and community

As place contributes to heritage it is heritage that mediates our sense of place (Ashworth and Graham 2005). A Sense of Place (SOP) is another difficult concept to define, and equally is difficult to measure. It is something that embodies within a person, and may not surface until years later. People develop a sense of place through a shared local knowledge to which communities have rendered social importance and meaning (Basso 1996). At an individual's level, one's SOP is being increasingly disrupted resulting in less engagement with the local and place. Reasons include globalisation (Colomer 2017, Menin 2003), social isolation, 'stranger danger' - the lack of freedom to play in a place (Carver et al. 2008), increased technology use by youth (Malpas 2008, Smith and Sobel 2010b) and living indoors with computers as company (Smith and Sobel 2010b). This lack of rootedness in an area (Colomer 2017) results in problems for young people's future care and understanding of their places. Part of the rationale for using technologies in this thesis is to harness young people's everyday computer engagement and direct it towards positive interactions with heritage, to encourage development of a sense of place. Without a sense of place, people may be dislocated and adrift (Basso 1996), dis-located (distanced from the local) (Newman 2009) and disconnected (Smith and Sobel 2010a). Neither do they have a sense of belonging, or connection to other people and the community. This 'cult of homelessness' as Orr (2013) calls a lack of a sense of place will destroy communities and will result in social and ecological degeneracy. Now more than ever, which the current pandemic Covid-19 has shown, we can see the value and importance of community. Place-making and heritage-making interactions are vital action steps towards developing a sense of place in young people and leveraging future benefits for their communities.

Heritage and place-making include many positive effects for communities and society (Stokowski 2002), for learning (Newman 2009), for well-being (Derr 2002, The Heritage Council 2016), belongingness and community (The Heritage Council 2016). Place-making, within varying contexts can lay down roots and foundations for a shared identity (Bradley and Kennelly 2008), environmentally educate, foster caring conditions (Derr 2002), and create understandings and bonds between people (Walsh 1992). If as Carman (2002) believes the purpose of heritage is to enhance understandings, of ourselves and what we do and to increase our lived joy in our shared world heritage can help us improve our present day and future lives. LeBlanc (1993) has suggested citizens and communities should provide opportunities for people to learn, to develop awareness of, appreciate, preserve and share their heritage. This can have positive impacts for people and especially new people to our communities (The Heritage Council 2017). If we fail to share our heritage, Carman (2002) points to heritage defeating its purpose. By place-making and engaging with heritage activities we are sharing our heritage, grounding ourselves in the local and with our community. However, there is the danger these activities make us feel superior or not inclusive towards all members of our communities (Carman 2002) or even stir up old conflicts (Thérond 2009). Additionally, challenges such as migration and an increasing multicultural society are not always viewed in a positive light (Sloane 2015). By engaging with heritage and place in a meaningful way we can better understand ourselves and others in our communities; we are making connections which Walsh (1992) points to as being the bottom-line in this post-modern world.

### 2.1.5 How heritage is associated with meaning, belonging and identity

How do we know if we are making meaning and what does making meaning mean? When we make sense of something we are making our own meanings. Doing that however, we may or may not be aware of our own cultural biases and assumptions, as when we make meaning it is always within our cultural framework (Staiff 2014). In our interpretations of heritage there is never one given meaning, meaning is made by us based on our previous cultural and social understandings. We make meaning of heritage when we are involved in the social aspect of 'doing' heritage, through interaction and conversation (Hall 1997), when we are on a heritage site, place or interacting with objects and artefacts (Hall 1997, Stokowski 2002). In the literature places and objects are not, in themselves, important in the formation of cultural heritage (Palmer 2009). There is general consensus the importance lies in the meanings and values that people attribute to places and objects (Giaccardi & Palen 2008, Palmer 2005, Smith 2006). When we make meaning we are also developing our Identities. Identity is also fluid and dynamic and negotiable (Jenkins 2008, Solli et al. 2011); it changes as we make meaning through social processes and is continually being created, negotiated and recreated in our learning lives (Smith 2006). As we learn we making meaning, make sense of ourselves, therefore

identifying ourselves and others. As Identity is a state of being or becoming (Jenkins 2008), we become different as we see the world anew (Jenkins 2008, Stagoll 2010).

Being involved in a community's cultural life is important for children's sense of belonging (UNCRC 2013), it forges their own sense of identity. New identities are emerging in local communities across Ireland and heritage is at the heart of Ireland's changing understanding (The Heritage Council 2017). Becoming aware of one's place motivates people to having a sense of belonging, contrary to other literature where says you have to have lived in a certain location over an extended period (Tan et al. 2018). A sense of belonging is important in developing a sense of place. As people make places, and if the purpose of heritage is to lead fulfilling joyful and purposeful lives (Carman 2002), then there is value in belonging for all communities.

There has been a marked increase in migration to Ireland from 1996 to 2009 (Gilmartin 2012) with the 2016 Census of Ireland seeing a 17.3% percentage of Irish citizens today born abroad (CSO 2017) and non-Irish immigrants coming from 180 different countries (CSO 2017). Schools and communities are seeing increased diversity with many of our new populations not having generations of roots in a place. Many children in this study are born of immigrant parents. Ethical and inclusion issues are important to any design with cultural heritage. People make places, and it is important to understand how people affect places (Walsh 1992). With this in mind it is important people new to the area are not disenfranchised or excluded and new inhabitants of a place feel a sense of belonging. Inclusion in heritage activities, place-making, can foster a sense of belonging for all new and existing citizens. The wisdom of the ages has shown us the value of belonging, how respecting and appreciating things that ground and earth us contributes hugely to our societal and familial belonging (Newman 2015). The challenge is in designing an ethical, inclusive heritage and place-making learning experience; in this study developing awareness and understanding of the local can foster a sense of belonging and a sense of place for all children in a manner heretofore neglected by museums and schools to date.

## 2.2 Challenges and Debates with Heritage

### 2.2.1 Values and 'whose heritage' in heritage

There are many challenges in heritage for example the question of 'whose heritage' or 'whose narrative' and to the value of heritage. Who can say what value a monument or a site is to a person or a community? Whose narrative has decided its value, and is that narrative appropriate to our present day societies? Lowenthal points to heritage credos as manipulative, and if we are not careful and control heritage, it will control us (Lowenthal 1998). Therefore it is vital for people to understand the whole picture of heritage. Not only does heritage include and exclude people (Carman 2002) in its

narratives and practices, the practice of heritage is complicated by different ideas of what 'value' is (Palmer 2009).

Values are subjective. They influence decisions when selecting what heritage to preserve and protect, how we represent our past and manage our present (Palmer 2009). Values define our monuments and sites and their narratives with some of these 'ways of seeing' including many ideologies that are not termed scientific, objective, or even rational (Fairclough 2009a). Values have become important in heritage. The Burra Charter (2013) originally an Australian charter for values with indigenous cultures has become standard practices for ethical issues and understanding, assessing and re-evaluating values (Waterton et al. 2006) and for a broadening of inclusivity and participation in cultural heritage (The Heritage Council 2015).

Understanding values is important as heritage is moving to being more about meanings and values rather than traditional notions of material sites, buildings and artefacts. Therefore, it is vital that there is a focus and dialogue around values, on what they mean, what they stand for and what they actually are. Today, we are constantly witnessing social unrest because of heritage 'values', usually centered on cultural power and a country's colonial past. For example, the public statue of a major benefactor of Bristol, E. Colston was pulled down in June 2020 by Bristol citizens because of Colston's alleged connection with the slave trade; in the USA there are many public violent episodes between people over 'white privilege', racism, and the flying of the confederate flag. All these events and many others happening around the world cause offence to someone's heritage and to inclusive societies.

Engaging with, being aware of, and understanding heritage allows young people think of these issues, in a time of global uncertainty. Although many values related to heritage are economic, in terms of jobs (European Commission 2018b, Royal Irish Academy 2016), revenues from sites, monuments (Department of Culture Heritage and the Gaeltacht 2018, LeBlanc 2010) many do not agree to foregrounding heritage centres, themes parks etc. (Hewison 1987, Rosenzweig and Thelen 1998, Walsh 1992). These authors point to the danger of commercialisation that could influence what heritage is about, destroy our 'identity-in-the-making', our deeper identities and contribute to a loss of sense of place (Walsh 1992). Here in Ireland because of the social, cultural and economic values associated with heritage, heritage has been given prominence in many Irish government initiatives for example Culture 2025, Creative Ireland, National Landscape Strategy (The Heritage Council 2017). In this research whereas the skills that children are developing are of future economic value to them (World Economic Forum 2020) the main rationale, value wise, is directed towards the social and cultural spheres.

### 2.2.2 'Found' heritage versus 'made' heritage debate

Within the discourse surrounding the definition of heritage, there are many interplays including values systems (Palmer 2009) as noted above. Dichotomies exist between nature/culture, 'made' heritage versus 'found' heritage (Solli et al. 2011), official/unofficial, insider/outsider (Ashworth and Graham 2005), economic/cultural, subaltern/authorised (Robertson 2012). For the purpose of this thesis the 'made' (constructed) versus 'found' (materiality) debate is of the most relevance. Authors such as (Solli et al. 2011), coming from an archaeological perspective foreground the value of the materiality as in e.g. historic churches and Stonehenge (a UK prehistoric ring of Standing Stones) as being the heritage ('found' heritage). Others such as Smith (2006) insist heritage is 'made' not 'found' and argue, using the example of Stonehenge, the material stones are not needed to make or use heritage. Smith comes from the perspective of the Australian indigenous Aboriginal people where interactions with special places, cultural, spiritual meanings and values produced are part of their cultural practice and heritage. Heritage in this context is a cultural and social practice of meaning and identity making (Smith 2006), interactions she believes make or constructs heritage. Solli's values and beliefs lie clearly at the material end of the continuum and Smith's values and beliefs lie towards the constructivist end of the heritage continuum. Constructivist theory, detailed later in the theoretical framework chapter informs the design of this study, however there are tensions when it comes to this argument as discussed later regarding an emphasis on the material in the history curriculum and our understandings of heritage. In 2015 a Heritage Council of Ireland survey found that when asked what heritage meant to people, 'built' [material] heritage dominated (Sloane 2015). Arguments against constructivism in the archaeology world include those from Holtorf (2013) who states there should be more emphasis on the material because of constructivism focusing on popular culture and non-specialist audiences.

There is a paradigm shift in heritage thinking and practice from the 'found' towards the 'made' heritage (Giaccardi and Palen 2008, Hall 1997, Palmer 2009). In this study I place myself and the research interventions on a continuum between these two approaches to heritage, as the context dictates. Throughout this thesis whereas there are tensions and balances to be addressed there is room for materiality - the tangible - in the shift towards a new heritage. Under an umbrella of creativity and playful learning theories, it is possible to 'change' the practice of 'official' discourse around heritage albeit in a small way, for children to create their own meanings and to move towards the constructivist end of the continuum without subscribing to an anti-essentialist view which underestimates materiality of heritage (Solli et al. 2011). Although the essentialist perspective of heritage (the materiality) is not fashionable within a constructivist world (Solli et al. 2011) there is a case for the inclusion of materiality. The intangible needs to attach to something tangible to exist



(Carman 2009). It is therefore important that critical thinking and an awareness of critical heritage is kept in mind when we evaluate and articulate our meanings and values we give to heritage.

### 2.3 Heritage Educational Practices

#### 2.3.1 Where does heritage and place fit as disciplines in education?

Within the literature heritage and place cover many disciplines. Within academia, heritage comes under the umbrella of several disciplines and has been described as trans-disciplinary (Council of Europe 2005), multi-disciplinary (Solli et al. 2011) and interdisciplinary (Carman 2002). In recent years, 'heritage studies' has become an area of study in its own right (Solli et al. 2011) It is a young discipline (Newman 2015), one that is accelerating fast into public ownership and public authorship with the discovery, celebration and stewardship of heritage (p. 2). In terms of 'place' some authors associate place or a sense of place with the geographical (Ashworth and Graham 2005); for others place is interdisciplinary (Avriel-Avni et al. 2010, Derr 2002, Orr 2013), it is to do with interrelatedness and therefore not a specific subject or discipline, or as (Orr 2013) says place is a mosaic of everything.

In this research an interdisciplinary approach was taken. As I hold an undergraduate degree and interest in archaeology I initially leaned more towards the archaeological perspective of heritage. Archaeology has had a dominant association with heritage (Solli et al. 2011) but heritage has moved from archaeology and conservation concerns to include other features such as educational processes, cultural life enrichment and the economy (Palmer 2009). Many other disciplines such as anthropology, history, geography and sociology (Solli et al. 2011), folklore, earth sciences (Newman 2015), tourism studies, memories studies, cultural studies and performing arts (Giaccardi 2011) form part of the heritage discourse. The global STEM (Science, Technology, Engineering, Mathematics) movement when paired with the arts and humanities becomes STEAM (the added 'A' for Arts). Heritage comes under the umbrella of the Arts in this categorisation of subjects and disciplines as does creativity. Therefore, like place, heritage is a mosaic of everything. Although particular disciplines can 'skew' heritage research in certain directions, for example archaeologists are interested in physical artefacts, geographers in place and art historians in high culture (Graham and Howard 2008), all of these disciplines form part of 'heritage' and inform my own understandings and the interdisciplinary literature on which I draw upon.

#### 2.3.2 Place-based education

As outlined earlier heritage and place are closely linked. This study is informed by both heritage and place educational practices. Place based education (PBE), or place based learning (PBL) is nothing new; Smith, Sobel, Gruenewald and Orr are some of the leading authors in the field. Different authors refer

## Chapter Two Literature Review

to either PBE or PBL although both can be defined as teaching and learning approaches that connect learning to the local (Smith & Sobel 2010) and to children's lived experiences (Smith 2002). Gruenewald, D. and Smith, G. (2008) refer to PBL as place-conscious education and argue how PBE can be the educational part of a broader movement, reclaiming in the age of the global the significance of the local.

Although PBE is not part of official curricula, nor does it hold any specific standing in contemporary education (Orr 2013), the literature shows that PBE and PBL are used in educational settings and for different reasons. Orr (2013) proposes PBL should serve as the backbone of the arts and sciences, the value lies in its hands on approach and the importance of the practical in shaping the intellect. In Sobel's research on place (1992, 1993, 1998, 2010) he explored how place could be building blocks for foundations in social studies, geography, and environmental education curricula as well as science, history, creative arts and English (Somerville et al. 2009). Although PBL is under researched (Harrison 2010), PBE and PBL brings value and meaning into the classroom and enhances student engagement, civic participation and environmental stewardship (Smith and Sobel 2010a). Schools are failing to engage students in preparing them for the real world and real life (Smith & Sobel (2010b). Schools have traditionally been isolated from community life (Gruenewald, D. and Smith, G. 2008), therefore students are not involved civically, and do not develop environmental stewardship (Smith & Sobel (2010b). Although focus on the environment is outside the scope of this thesis, the disconnect between classrooms and real world (Smith and Sobel 2010a), and the tensions between education and environment culture need to be reconciled for human welfare (Gruenewald, D. and Smith, G. 2008). PBL can not only engage children with heritage and place but can also lay down foundations for future environmental civic action. Global citizenship is one of UNESCO's transversal competencies and is as important capability for children to acquire (UNESCO 2016).

PBL also builds leadership (Newman et al. 2013, Smith and Sobel 2010a), social capital (Derr 2002), and affords children the opportunity to see themselves as creators and not consumers (Smith and Sobel 2010a). When students create rather than consume they are making meaning and learning. When they channel their creations to engaging with the local they engage with community life, developing an awareness of their place that leads to caring for their place (Gruenewald, D. and Smith, G. 2008). As PBL contributes to the learning ethos of this research and heritage design, heritage and place making activities such as in this research afford students this opportunity to develop awareness and understanding of their locality, sowing seeds for future civic participation. If through education children connect to their place, they begin to understand how places are shaped, they become ready for social action, and with guidance develop skills for effective participation in society (Gruenewald, D. and Smith, G. 2008). Walsh (1992) writes that in understanding a place it is developed:

## Chapter Two Literature Review

through a communality which is constructed on the basis of a shared intersubjectivity, not bound by gender, race or class; positions regarding the past will necessarily be influenced by such factors, but developed through a common position regarding the processes which affect places

(Walsh 1992, p. 159)

In brief, the bottom line in the post-modern world must be 'making connections' (Walsh 1992, p. 159).

### 2.3.3 Formal, non-formal, free choice and informal learning environments

Education has been traditionally associated with institutions, be it schools or museums and has become associated with gaining knowledge and skills, often 'geared towards the labour markets' (Jarvis et al. 2003, p. 4). Formal learning is highly structured and institutionalised (Sevdalis and Skoumios 2014), covers an education system that spans from primary school from to university level (Sevdalis and Skoumios 2014) and is associated with standardisation, and the testing and grading of factual knowledge (Jarvis et al. 2003). Formal learning is regarded as the dominant system of learning in society (Sefton-Green 2004, Sevdalis and Skoumios 2014) yet it is only one provider of potential learning sources for people (Gruenewald 2003, Jarvis et al. 2003).

Because learning is an individual process (Jarvis et al. 2003) children initially learn within the family circle. However, once they go to school, school generally takes the responsibility for guiding learning (Schauble 1996). Outside of school and the family, there are several out-of-school programmes and institutions for supporting learning in children and young people (Schauble 1996). All these places of learning are termed either formal, informal or non-formal even though these terms can be interchangeable (Eshach 2007) and can be considered problematic (Falk 2006). Generally formal learning is highly structured, non-formal is slightly structured and informal learning is less structured (Eshach 2007).

With informal learning, there is no mediator, facilitator or authority figure (Eshach 2007), it is voluntary and self-directed (Screven 2002), unsystematic and unorganised (Sevdalis and Skoumios 2014), is neither deliberate nor intentional (UNESCO 2015), is intrinsically motivated (Csikszentmihalyi and Hermanson 1995) and forms the basis of lifelong learning (Falk and Dierking 2013, Sevdalis and Skoumios 2014). It is difficult to define as it can be interpreted as any learning outside of school, or part of a leisure activity rather than an examination (Sefton-Green 2004). It can be considered spontaneous learning, e.g. in our homes, playgrounds, and learning through experiences in our environment (Csikszentmihalyi and Hermanson 1995). Informal learning includes the experiential nature of learning and ideas of fun, pleasure, wonder, feelings, surprise, peer and personal responses (Sefton-Green 2004) which are more in line with the ethos of this thesis. In the context of museums and environmental learning Falk (2006) prefers the term free choice learning rather than informal as

it captures the non-linear, free choice of learners to choose what, where and when to participate in their learning (Falk and Dierking 2000). Free choice learning is exploratory and social (Maher 2015). Although this design straddles aspects of all forms, formal and informal learning are the terms used going forward.

### 2.4 Heritage Education and Learning in Schools

#### 2.4.1 The Irish formal education system

Formal Education in Ireland for young people consists of a primary, secondary and third-level education. The primary education sector in Ireland includes private, state-funded and special schools. Children start school at four to six years of age and continue through an eight year cycle where they then transfer to post-primary (secondary) education (Department of Education and Skills n.d.). In the Primary School Annual Census for 2019/2020 there are 3106 schools (559,378 pupils) listed under the auspices of the Department of Education and Skills in the Irish state (Department of Education and Skills 2020). Additionally there are 133 special schools (8353 pupils). Secondary education consists of a Junior Cycle (three years), followed by a Senior Cycle (two, or three years with an optional transition year).

##### *2.4.1.1 Primary school curriculum*

The Irish primary school curriculum (1999) is designed to nurture the child in all aspects of their lives, cognitive, emotional, imaginative, social, aesthetic, physical, spiritual and moral (Department of Education and Skills n.d.). The curriculum is divided into six parts, of which Social, Environment and Scientific Education (SESE) is most relevant to this thesis covering heritage and place. The SESE curriculum aims to foster the development of children's awareness and appreciation of the human, natural, social, historical and cultural aspects of life (Department of Education and Skills n.d.). SESE covers History, Geography and Science. Heritage is not an official subject on the Irish primary school curriculum and likewise in the U.K. heritage education is not part of their school curriculum (Lackovic et al. 2015). Within the formal school system cultural heritage and archaeology for primary school children come mostly under 'History' in the Primary School Curriculum (NCCA 1999b). The history curriculum is divided into Strands and then into topics called Units. Some elements of place are intertwined with natural heritage and related curricula is found under Geography (NCCA 1999a) and Science. Relevant topics, strands and units in the SESE curriculum are listed in Table 2.1.

## Chapter Two Literature Review

*Table 2-1 SESE Relevant Primary school History and Geography Strands and Units*

Curriculum Overview	History	Geography
Primary	Focus is on how the activity of people has shaped human, built and cultural environments. The lives of the past, national and international history, local studies and the work of the historian are studied.	The essence of this subject is understanding the world around us and developing a sense of place and space. Three major themes of place, space, and environment.
Relevant Strands and Units	<b>Local studies</b> (Strand) – Units; Buildings, sites or ruins in my locality, My locality through the ages, <b>Homes, Feasts and festivals in the past Story</b> (Strand) – Units; Stories from the lives of people in the past • Myths and legends <b>Early people and ancient societies</b> (Strand) Stone Age, bronze age peoples, Celts, Vikings, Early Christian Ireland <b>Life, society, work and culture in the past</b> (Strand) - Units; Life in Norman Ireland, Life in mediaeval towns and countryside in Ireland and Europe <b>Eras of change and conflict</b> (Strand) <b>Politics, conflict and society</b> (Strand) <b>Continuity and change over time</b> (Strand)	<b>Human Environments</b> (Strand) learning about people and their interrelationships with environments <b>Natural Environments</b> (Strand) developing knowledge of natural environmental features in the locality and wider environments <b>Environmental awareness and care</b> (Strand) geography and science can foster the child's appreciation of environments and his/her sense of responsibility for their conservation and enhancement
Junior Cycle	The Nature of History; the history of Ireland, the history of Europe and the wider world. The Junior Cycle History specification provides clear opportunities to progress the related learning that has taken place at primary level throughout the three years of junior cycle.	How geographical processes form and shape our physical, environmental, and social world. Exploring people, place, and change, the physical world, and how we interact with the physical world.

### 2.4.1.2 Secondary school curriculum

In Ireland, at secondary school level heritage, archaeology, heritage and place come under the umbrella of History and Geography and are a small part of a three year school cycle which culminates in a state written examination (Junior Cycle). Since the introduction of the new Junior Cycle in 2018, history was downgraded from a core subject to an optional subject for the state Junior Cycle examinations. However, after a public outcry, the subject was recently reinstated as a core subject. For the next cycle in secondary school, the senior cycle, history is a choice subject. In the UK Students studying for AS and A level (age group 16-18) can select archaeology as an independent subject (Lackovic et al. 2015) which is not the case in this age group students in Ireland.

### 2.4.1.3 Cross-curricular education

This study was cross-curricular as it drew on history, geography, English, art as well across ICTs. Cross-curricular learning can mean topic work, project-based learning, thematic work, or interdisciplinary learning (Kelly 2012). Cross-curricular learning has been traditionally associated with constructivist child-centered approaches in primary schools especially with younger children where learning is naturally interrelated (Kelly 2012). While debates regarding cross-curricular versus subject matter are

evident in the literature many disciplines indicate the benefits of their subjects for teaching other subjects e.g. geography to teach science, history to teach geography etc. (Karvanková and Popjaková 2018, Rowley C and Cooper 2009), and how other subjects can enhance children's learning (Kelly 2012). Cross-curricular engagement was an important for this study as to engage with heritage meaningfully required the inclusion of different disciplines.

### *2.4.1.4 Heritage and history in the curriculum*

Heritage is an interdisciplinary concept in the context of the Irish primary school curriculum as discussed earlier. There are ongoing tensions between the disciplines of history and heritage. Many people associate heritage with history (Lowenthal 1998) and although they can be described as two sides of the 'one coin of pastness' (VanSledright 2008), they are different concepts, and different disciplines. Heritage is not believed to be an inquiry into the past as with history (Lowenthal 1998) and because heritage is concerned with re-packaging the past for present day purposes, Harrison (2013) believes it must be seen apart from history. Nevertheless, heritage is still part of the history curriculum in Ireland, therefore any interventions in schools must meet schools requirements regarding their obligations to the history curriculum. This caused some tensions in the evolving design as the separation of heritage and history is not one generally carried out in practice, in schools or museums.

### *2.4.1.5 Tensions in history and 'local history' curriculum learning*

The literature shows how some children find history enjoyable, because of the opportunities to follow their curiosity, use their imaginations and be involved in active learning (Cooper 2018a). However, within the school curriculum, history is found to be a boring subject in school (Lowenthal 1998, Preston 1969, Rosenzweig and Thelen 1998, VanSledright 2008). The subject is presented in a lifeless fashion (VanSledright 2008), it is useless (Preston 1969), irrelevant (Rosenzweig and Thelen 1998), dull and uninspiring (VanSledright 2008). It is students least liked subject (Preston 1969, VanSledright 2008), and students would avoid it if they could (VanSledright 2008). To alleviate this boredom with history, Preston (1969) suggests more interaction with the local is needed. But what constitutes the local? Plymouth (1933) defines the local as the road that leads from your front door to the end of the world. Equally important from (Hales 2018) is that the local is not just the physical locality but also the cultural heritage of a child, which may not be geographically based where they are presently living. The local hold enormous potential as educational resources (Dewey 1938), is key to making history relevant to students and is instrumental in developing a sense with the past (Preston 1969). The enjoyment of local history is vital in order to increase children's interest in history (Preston 1969). The local shows the ordinary local people and their contribution to history and heritage, rather than

narratives about exceptional people (Plymouth 1933). Hales (2018) has suggested moving from a 'local history' curriculum to placing the 'child as the local' where community and personal history is at the heart of the curriculum resulting in children becoming empowered, engaged, and inspired in their history learning. Equally this is of importance to heritage and is central to developing heritage engagement in this thesis. Although local history has low status in education (Hales 2018) it is important to foster involvement in the local. The consequences include identity issues, and a lack of self-awareness for children as well as a decline in historical [heritage] understandings and personal interactions with history [heritage] (Hales 2018). The 2019 Department of Education and Skills primary schools 'History' Inspectorate reports for history found, in some schools, a strong emphasis on local history resulting in "great knowledge and understanding of the historical heritage of their local area" (Department of Education and Skills 2019). However, within the majority of the 2019 schools covered (n=9) there was scope to enhance knowledge of local history. Recommendations by the Department of Education and Skills included the provision of more opportunities for local history explorations, the use of a wider range of resources, Information and Communications Technology (ICT), and active learning methodologies.

There are tensions in the way history is taught in schools. On one hand, text books are deemed to be a problem for teaching history, many of which are irrelevant to students lives, do not include their histories, are a form of nation-building propaganda (Cooper 2014) as well as being the only reference material used in the classroom (Cuenca-López and López-Cruz 2014). On the other hand, constructivist learning principles in history education encourages questioning, exploration and finding out the answers to questions. This cannot be addressed in a textbook (Cooper 2014). Historical imagination on one hand is welcomed (Cooper 2014) and on the other is deemed not suitable for the constructing of historical accounts (Egan 2007). Teachers fail to curb its (imagination) influence in the context of teaching history (Egan 2007). Although myths in the teaching of history can 'erode particulars' (Egan 2007), children's use of their imaginations is vital to making sense of the past. Imagination is where the child resides (Dewey 1966) and imagination is of 'intrinsic value' to good creative history teaching (Cooper 2018a, Turner-Bisset 2005). Although myths are an oral tradition not concerned with accuracy (Egan 2007), and the Irish primary school curriculum teachers guidelines recognises how myths and legends can sit uncomfortably with historical episodes, stories are important for the transmission of cultural heritage and therefore have a role in the history curriculum (Department of Education and Skills 1999).

Imagination and creativity are important features of a playful approach. In the context of history, the value of learning locally is well recognised. Through the local, history gains significance and value (Plymouth 1933) and although argued against by Egan (2007) it stirs historical imagination

(Plymouth 1933). The focus on the place we live, the thinking and doing of activities tied to the local rather than through abstract knowledge make it more real and allows for affective engagement playfulness and creativity (Orr 2013). Imagination helps to what Plymouth identifies as the importance of children understanding their village had a past, and how this can give a sense of confidence and belief on the village's future and not a place which they may want to escape (1933).

### 2.5 Heritage Education and Learning in Museums

#### 2.5.1 The role of the museum

The 2007 ICOM definition of a museum was due to be revised in 2019 to additionally include references to diversity, inclusivity and social justice. However, at time of writing it is still under discussion (Candlin and Larkin 2020), the new proposed definition has not been ratified and the 2007 definition stands:

*A museum is a non-profit, permanent institution in the service of society and its development, open to the public, which acquires, conserves, researches, communicates and exhibits the tangible and intangible heritage of humanity and its environment for the purposes of education, study and enjoyment.*

(ICOM 2019)

Although there is disagreement about the true nature of museums, and what counts as a museum, the role of the museum is that of a public service and therefore should serve the public for the people's needs. Museums promote their value for society as being community anchor institutions (Falk and Dierking 2013) and they play a role in shaping the communities ideas on history, heritage, art and science (Wong and Piscitelli 2018). However there is the question of what community actually means. The absence of diversity and inclusion from the proposed museum definition speaks to this issue as it is from diverse communities the museum "must find its role, be relevant, and seek value" (Crooke 2007, p. 1).

Debate continues over the new definition of museums that would move the role of museums towards more diversity and inclusion. Saying that, new perspectives from a diverse public are evident in many museums (Hein 2014). Change is happening in the museum world (Hein 2014). Boundaries are becoming blurred between the real world as exhibitions have become more people-centered, idea centered and contextualised (Hein 2014, Sabiescu et al. 2017). Museums are changing narratives and moving away from focus on objects to be more inclusive of their communities (Sabiescu et al. 2017) and towards community histories and personal stories (Rozaan 2017). Many are emphasising the promotion of 'experience' (Hein 2014). This change has been so dramatic in the way museums now



present objects, information and ideas that there is a shift in public perception in the role museums can play in people's lives (Falk and Dierking 2000).

### 2.5.2 Education and learning in museums

Education has been traditionally associated with institutions, be it schools or museums. Education is the core mission of the museum (Hein 2014) and has greatly changed over the past two decades (Hooper-Greenhill 2007). Although museums have been involved with educational programmes since the nineteenth century the term 'education' was not specifically used by museums as they favoured the term 'interpretation' (Hein 2006). Education at this time was for the privileged few (Hein 2006) and quite elitist (Jarvis et al. 2003). However, in 1992, the first mention of education was included in a report by the American Association of Museums which explored the definition and role of museums, as an institution of education and public service and one that includes exploration, observation, research, reflection, critical thinking and dialogue (American Association of Museums 1992, cited by Hein 2006). The educational role in museums is changing and becoming less linear (Hein 2014). In the last twenty years museums have significantly increased the amount and types of programmes for families, children and schools (Piscitelli and Penfold 2015). Education is catering for varying diverse audiences and cognitive styles; and is extending to dramatic delivery and blending with entertainment (Hein 2014). Historically, showing objects has been the mission of museums. However, objects have now become sites of experience and museums are delivering these experiences (Hein 2014).

Hooper-Greenhill and Mousouri (2000) did a review of learning in a variety of museums during the 1990s. They identified a need for more research into museum learning and asked that such research be transparent and detail the processes of learning across all kinds of museums. 'Learning' was marginalised in museums but there has been great progress in recent years (Bellamy and Oppenheim 2009). The concept of learning is now a set of learning processes rather than knowledge or scholarship (Hooper-Greenhill 2007). Andre et al.'s 2016 review was the first paper to cover theoretical and empirical studies about children's learning from 1999-2012 across different countries. The review found that research on learning in museums has mostly focused on science centres with little research on learning in archaeology and history museums or on educational programmes in museums (Andre et al. 2016).

Museums have been challenged in acquiring and retaining new audiences (Kindler and Darras 1997). Attracting children to museums is a challenge for cultural heritage museums (Dindler et al. 2010). Museums are generally not perceived as being the most enjoyable way of learning about the past (Hooper-Greenhill 2007, Walsh 1992) and are often seen as stuffy (Walsh 1992), places of silence, discouraging interaction (Walsh 1992) and remain 'don't touch' places (Dudley 2010). Although that assumption still exists, museums not only offer ways of learning that complement the curriculum but

they offer much more to younger people in terms of wonder and excitement, developing awareness of self and place, and opportunities for creativity which may remain untapped in the schooling system (Bellamy and Oppenheim 2009).

The museum has great potential for developing identity programmes (McLean 2008) as well as fostering a sense of belonging and sense of place (Dicks 2007). Harrison (2013) suggests a model that does not distinguish between 'cultural' and 'natural' is concerned with making connections, between humans and non-humans, and ways all persons can work together to keep the past alive in the present. These arguments are important for this research. When designing museum workshops it foregrounds the potential the museum environment has for learning and engagement with cultural heritage.

### 2.5.3 Balancing fun and entertainment in the museum

Museum learning has been characterised as edutainment and consequently was distinguished from museum education and school education (Hooper-Greenhill 2007). However, museums are pushing the boundaries on what constitutes 'fun' learning, and fun that is merely entertainment (Hein 2014). There are tensions between education and edutainment and museums are no exception to this dilemma. What is needed is a balance which is difficult to achieve. Fun and learning can happen together. Recognising that learning and enjoyment can work well together is what Hooper-Greenhill calls a post-modern rejection of the 'either/or' in favour of an inclusive 'both/and' (Hooper-Greenhill 2007). Equally, Falk and Dierking find the separation of fun and learning problematic. They advocate for both fun and learning rather than an either-or proposition (Falk and Dierking 2013).

## 2.6 How Are Children Engaging With Heritage And Place?

Children's main interactions with local heritage can take place in school, in a museum or heritage centres either solely or with family or friends. Schools provide the curriculum framework and many museums, arts and heritage centres provide either online and/or in-situ learning programmes for children and families. Access to local heritage and history education could be improved in both the formal and informal learning sectors. Borman (2005) points to the value of physical visits to heritage sites by school children. In a study by Borman for *English Heritage*, the UK equivalent of the *Heritage Council of Ireland*, the biggest challenge in heritage education is the barriers that schools face and how children are not getting to visit sites because of cost, health and safety (Borman 2005). Because we live in a society where everyone does not have the same opportunities, the same access to, or interest in visiting museums or heritage sites some young people are seriously disadvantaged in terms of their potential learning and development as a result.

## Chapter Two Literature Review

A UK nation-wide household survey ‘*Taking Part*’ that measures engagement with cultural sectors was carried out in 2019 (Department for Digital Culture Media & Sport 2019). The survey provided information and knowledge to the *Arts Council England*, *Historic England* and *Sport England* on the impact of art and culture on young people’s lives and an understanding of the longer term benefits of these interactions (Table 2.2). As can be noted from the statistics, the survey shows some children, if they are relying solely on visiting sites/museums through school field trips, have a very small chance of visiting heritage sites. Schools need to be interacting with and accessing more with local heritage sites in order that knowledge, awareness and understanding gained from such visits is equal for all children. The large divide between those that have access to heritage sites inside and outside school shows the inequity and privilege for some children. Likewise In terms of the numbers of children visiting museums the survey found nearly 40% of children have never visited a museum and 13.2% of those that had visited before had visited with school only. The largest amount of children visited museums outside of school time (32.7%). Whereas the museum is an effective informal learning environment, it as a public institution must strive to be more inclusive and address those children who may find not have the opportunities or interest to visit a museum.

Table 2-2 Taking Part Survey UK 2018/2019

Taking Part Survey UK 2018/2019			
Visited a Heritage site in past 12 months – children age 11-15			Never visited a heritage site
67.2%	As part of school	7.9%	32.8%
	Outside of School	44.8%	
	Both In and Outside School	14.3%	
Taking Part Survey UK 2018/2019			
Visited a Museum in past 12 months – children age 11-15			Never visited a museum
60.1%	As part of school	13.2%	39.9%
	Outside of School	32.7%	
	Both In and Outside School	14.2%	

### 2.6.1 Formal School Heritage Education

In primary schools in the UK and Ireland there are no textbooks for history or heritage. Teachers have the freedom to choose what and how they teach history; the quality of which may depend on the enthusiasm of the teacher (Cooper 2014). There are many external primary school learning resources that Irish teachers can access including:

- *Scoilnet*, the official government education portal provide links to external heritage resources and to curriculum linked projects created by participating teachers (Scoilnet 2020);

## Chapter Two Literature Review

- Official Government Education Centres in Ireland provide teachers with downloadable resources such as '*Archaeology in the Classroom*', a set of twelve modules to supplement the SESE history element of the curriculum (Limerick Education Centre 2013);
- The Heritage Council of Ireland run a *Heritage in Schools* scheme which allows for visits to primary schools by registered heritage experts on cultural, natural and built heritage. The scheme draws on hands-on and place-based learning (Creative Ireland 2017b). In the UK, a Heritage Schools programme provides teachers with heritage knowledge for the classroom and enrichment of the curriculum (Council of Europe 2017). The emphasis is similar to Ireland's scheme where the emphasis is on the local and bringing history and heritage to life' (How and Bell 2019). However, In Ireland specialists come in to the school, in the UK the teachers attend CPD courses with Historic England and they create and deliver the heritage programme. This research differs to both by taking the children out of the classroom, with physical presence at heritage sites and around their place.

The European Commission have existing toolkits for teachers to explore shared European Heritage with pupils aged 10 to 15 in a fun way (European Commission 2018a). The toolkit aims to foster care and conservation of cultural heritage and to foster a sense of belonging. The sixteen suggested projects include research, heritage activities (some outdoors) and presentation to peers and public.

For secondary students, apart from their curriculum textbooks, there are opportunities to participate in heritage related projects with '*Creative Engagement*', an Irish government initiative Arts-in-Education programme to encourage creativity, initiative and expression and to complement curricular learning in heritage, arts and culture (Creative Ireland 2017, p. 28). Additionally, 'The Royal Institute of the Architects of Ireland' (RIAI) developed resources for older children (15-16 year olds) on 'Shaping Space', these included lesson plans around 'My Home, Neighbourhood, Village, Town City' and 'Building through History' (RIAI 1997). Elements of these resources are used in primary schools as well as in some teacher training colleges. As with Ireland, in the UK Archaeology-related topics are part of the history curriculum for secondary schools. However, in students' later secondary school years, in the UK students can select archaeology as an independent subject for their AS and A level (age group 16-18) state examinations (Lackovic et al. 2015). In Ireland history and geography are secondary school subjects that cover aspects of heritage, archaeology and place.

### 2.6.2 Other Out-of-School Heritage Education Opportunities

Ireland have a national heritage week with public organised activities and which is held annually in August. As August is outside term time, school children are dependent on parents or guardians to accompany them, therefore not all children can avail of these heritage activities. The European Heritage Days programme run an annual European Heritage Makers Week (EHMW) to engage youth

online and in their immediate surroundings (European Heritage Days 2018). One past #HeritageMakers event encouraged children to write and submit a story about the shared cultural heritage around them. Eighty-two stories were submitted (as at 5th October 2018) but stories were only submitted from eight EU countries, not including Ireland or the UK. This idea that could be developed within European schools, museums and heritage centres but is not widely supported as of yet. In Ireland there is only one main organisation, *BurrenBeo*, based in the west of Ireland whose place-based learning toolkits for local schools focus on the special ecological area of the Burren, Co. Clare which is rich in environmental, marine and archaeological resources.

### 2.6.3 Informal and Online Learning in Museums

Due to the Covid-19, the virus that swept the world in 2020, many countries' citizens were put into lockdown with schools and colleges, museums, closed across the world for a couple of months. People were asked to self-isolate in their own homes. For parents who had children at home for many weeks, due to school closures, many museums and learning institutions shared learning resources freely online. In normal non Covid-19 times, museums carry out face to face learning programmes in their institutions. However, many learning programmes are in the process of being digitised and delivered online. Whereas educators and facilitators came to museums to carry out youth programmes such as at the Chester Beatty Library Museum in Dublin where they invites in communities and carry out maker activities as part of their educational programmes, this is no longer possible at time of writing (late 2020). In Ireland, the National Museum of Ireland provide an 'Explore and Learn' educational programme within their cohort of museums that ties in with the Irish School curriculum. As at time of writing, the museum are working to develop and increase their online content for students and teachers (NMI 2020). In the spirit of helping others, many educators offered to share syllabi and links to learning resources increased through the social media hashtags from museums (#museumed, #museumedchat #museumfromhome). In Ireland new learning programmes such as the viking and medieval learning centre 'Dublinia' responded with new online learning resources for primary and secondary students (Dublinia 2020). In the U.K. Websites such as My Learning (mylearning.org) have free curriculum-based learning resources for teachers from heritage, arts and cultural organisations. The Age of Revolution (<https://ageofrevolution.org/>) hold many teacher resources based on the years 1775 to 1848, and also host creative and digital curriculum-linked ideas and activities for children such as animation making and using Scratch (child-like computer programming) to interact with heritage. Museums such as the Jewish Museum in London offer distance learning and virtual classrooms that offer award-winning workshops. However, not all museums have online resources and rely on physical visitors. Unfortunately they may suffer from lack of physical visitors in the future, depending on the

duration of this pandemic. There is a need now for museums to further embrace the digital. Museums have had to shift to the digital world at unthinkable speed (Culture 24 2020) and for many museums this is problematic (Art Fund 2020).

### *2.6.3.1 Museum learning and technology*

Museums must change to meet the learning demands of a 'tech savvy' public (Falk and Dierking 2013). Whereas engagement, curiosity and interest are significant for learning so too are technologies that are breaking through existing forms of learning (Falk and Dierking 2013). Digital toolkits are gradually being created in museums that allow museums provide more information about objects and exhibits encouraging new interactions with cultural heritage (Smirnova and Vinck 2019). An Irish DBR study in 2004 explored the active engagement of a primary school children in the context of a museum exhibition (Hall and Bannon 2005) and delivered a set of design guidelines as an evolving theory of practice (Hall 2004). In other research mobile technology has been found to support playful interaction with museum exhibits in children's learning (Yiannoutsou et al.), attract new audiences and increase engagement with the museum (Sanderhoff 2014). Participatory museum activities scaffolded by technology has been found to offer rich learning experiences and to create a lasting relationship with the museum (Yiannoutsou and Avouris 2014). In the Netherlands, Waag work at the intersection of science, technology and the arts. Through a series of ongoing projects their *Future Heritage Lab* involves artists, researchers and museums in developing interactive exhibits, applications and methods to change the way heritage is experienced (Van Dijk 2018). Their aim is to aid heritage in its role of enhancing creativity, identity and social cohesion. Similarly *TEChE* aims to change children's heritage experiences and to build on making connections in order to understand ourselves, each other, to foster mutual respect and understanding and to live more peaceful and empathetic lives.

### *2.6.3.2 Exemplar A: using technology engagement to develop an exhibit with teenagers*

At the Moesgaard Museum in Aarhus, Denmark an eight month anthropological (rare) approach study was carried out of the digital cultural practices of teenagers, including technology engagement and participation while developing an exhibition together (Smith and Iversen 2014). Conversation and a dialogic process within museums formed the core of this museum project. The dialectic relationship, a learning relationship, between the design process and the creative forms of engagement was embedded within the final exhibition (Smith and Iversen 2014). In this study, engagement was moved into the process rather than being the outcome. The study set out a set of eight design principles to clearly articulate their dialogic process. These included many features present in the *TEChE* engagement and learning process. Design principles included the museum experience should be a socially engaging experience rather than an individual one, the communication must be dialogic rather

than linear, the exhibition was to start from young people's everyday experience rather than formal heritage, museum objects included in the exhibition should act as props for action, it should be constructivist rather than static (constantly changing and processual), the audience should have a central role in the creation of content and experiences rather than the museum, the installation to be digital and interactive rather than analogue, and it should be carried out in a hybrid environment (between exhibition and town of Aarhus in Denmark) rather than in a confined space. This thesis drew on many similar principles and factors of this Danish research (participatory design, socio-cultural approach), and was helpful for consulting practices in other learning contexts.

### *2.6.3.3 Exemplar B: cross-context studies - bridging the gap between school and museum*

Cahill et al. (2011) devised a technology programme called Zydeco which crossed both classroom and museum and supported inquiry based learning. Drawing on the *Contextual Model of Learning* (Falk and Dierking 2000) It allowed preparatory work to be carried out within the classroom, questions and sub-questions to be generated and then uploaded online. Once the 86 students from 7th Grade (USA) were on their field trip to the Museum they were able to download their work onto hand-held devices (iPods), take images, add audio and tags in the museum which in turn they could access from their classroom after their museum experience. The author's video recorded different stations and exhibits within the museum during a special archaeology day at the museum. Students spent 35 minutes on each of the museums three floors, using the Zydeco programme on one floor and worksheets (designed by the museum educator and archaeologists to match curriculum) on the other two floors. The authors found that although there was an air of perception that children with their 'heads-down' on the devices were not listening or paying attention, there was very little quantitative difference between 'heads-down' using the technology and 'heads-down' using worksheets. The authors suggest that 'heads-down' with a worksheet is perceived as learning and note-taking, whereas 'heads-down' with hand held devices is perceived differently (p. 27). They did find that using the technology increased sociocultural engagement like sharing their work with peers and docents, as well as an increase in discussion over sense-making. Discussion were found to be powerful way to learn on field trips, allowing students to build new understandings onto previous knowledge.

### *2.6.3.4 Exemplar C: cross-context studies - bridging the gap between school and museum*

In Sydney Australia, research by Maher (2015) connected learning in the school and museum. The research focused on the use of iPads by 12 year olds in both learning contexts. Although Maher found evidence for supporting and linking learning between the two institutions, the iPad did not support learning at the museum. Although children were facilitating their own learning, developing their multimodal learning skills and social interacting while using the iPads at the museum, Maher found



the iPads does not suit all museums hands-on experiential learning (as in science museums). He found limitations in the public space of the museum such as Wi-Fi challenges and taking photos in possible culturally sensitive settings (Maher 2015). The iPads were found to be distractions to learning in the school although not at the museum (because of Wi-Fi challenges there). This study proved helpful when evaluating the use of iPads in both learning contexts. Using iPads anywhere is going to be context dependant and no two contexts may be similar.

### *2.6.3.5 Exemplar D: cross-context studies - bridging the gap between school and museum*

Kings College London have developed a programme to bridge the gap between school and museum learning called the 'My Primary School is at the Museum'. They have developed an educator's toolkit to support building partnerships and collaborations between the two environments. What is different about their model which they are currently working on implementing in schools is it is designed by teachers and museum staff (MPSM 2017). In this thesis, the design is framed by adults, but the developing design is informed by children's ideas and perspectives.

### *2.6.3.6 Exemplar E: Museum learning and place*

Little research has been done in relation to place and sense of place or place attachment in museums (Kalessopoulou 2019). In her study in two child-centered museums, Kalessopoulou (2019) explored place meanings and resulting levels of affect and satisfaction in participating children (N=60, aged 4-12). The research aimed to determine different dimensions of a sense of place. The study used different methodologies such as Clarke & Moss (2012) Mosaic Approach and an ecological psychology approach based on Gibson 2015 (children's interactions with places). Analysis of observations, interactions and semi-structured interviews followed a phenomenographical approach to acquire detailed descriptions of place meanings. Findings were grouped under three experiential modes; personal (self - children had fun and enjoyed), social (others - positive social interaction opportunities for 'togetherness') and physical (environment - experiential different unexpected ways of interacting with objects). The exploratory study is the first study to produce a framework on the concept of a sense of place while actively involving children in a child-centered museum environment (Kalessopoulou 2019). The resulting framework consists of six dimensions; *enriching, empowering, playful, epistemic, social/associative, aesthetic*. The study is more focused on experience-based dimensions, rather than a dialogic approach to understandings which was carried out in DC3 in this thesis. Additionally, with the other two design cycles in this research, the museum was not specifically child-centered as in the above study and where play is a core feature. Museums are different and each have different contexts; the playful dimension at the heart of child-centered museums is what differentiates it from other museums (Kalessopoulou 2019).



### *2.6.3.7 Exemplar F: Museum learning and place*

Walsh (1992) suggests the museum should be making connections between people and place and the museum should serve as a facilitator when attempting to develop a sense of place. However, whereas place-based education (PBE) has its roots in school system (Utt and Olsen 2007) there is little in the way of PBE in museum pedagogy (Kalessopoulou 2019). Utt and Olsen (2007)'s study found PBE is easily transferable to a museum setting. The study, carried out within three different museums, engaged in place-making by involving communities in decision and strategy planning, going outside in the locality with programmes, and tying in with physical happenings in the locality e.g. having a camera on a birds nest that could be interacted with within the museum (Utt and Olsen 2007). These museums incorporated an important aspect of PBE which is participating in civic life, decision making and young people seeing themselves as creators and not consumers (Smith 2002). Their findings stated PBE or PBL allowed museums to preserve their piece of local culture by not just facilitating individuals but by opening it up to community and conversations (Utt and Olsen 2007). Within different museums as mentioned earlier there are different contexts and different variables. Whereas these exemplars on PBE within museums are useful not all factors can be considered in a PBE programme. It is context dependent.

### *2.6.3.8 Exemplar G: Museum learning and place*

The RSA (Royal Society for the encouragement of Arts, Manufactures and Commerce) is a UK organisation that is at the forefront of social change. It has developed a place-based curriculum that was piloted in four schools in Manchester and five schools in Peterborough and is used in museum learning programs, such as in for example Leeds Museums and Galleries (RSA 2010). The RSA gives advice on setting up a locally based curriculum. Their toolkit for educator's outlines the idea of place-based curriculum and stresses how there is no one for all model, each area has its own specific contexts. Similar to the design in this research, each context is different but the model is adoptable and adaptable. Their design guidelines are the product of their research, from which their toolkit sets out criteria for projects and practical start-up aides such as partnership agreements and scoping session agendas for schools. The model by the RSA is an ideal scenario for developing place based learning in cities or local areas and connecting school learning with museum learning. However, it is not known the success or the take-up of the curriculum but the model is useful as a benchmark of the potential of incorporating place-based learning into children's learning environments.

### 2.6.4 Playful approaches to heritage education

All cultural heritage is recognised globally as being important to people. However, there are many challenges in respecting all our heritages and in protecting it. Once our heritage is lost it is lost, therefore it is important to foster heritage awareness and understanding in young people of today. As noted above there are many forms of heritage education, both in the school, out of school and in the museum. Debates in the 1980s and 1990s on uninteresting history classes argued for including more authentic and meaningful primary resources to engage students doing history, to move from fact based approach to inquiry based approach and to integrate web-based digital historical primary sources for this purpose (Lee et al. 2006). This approach was taken in this thesis. However, whereas educational changes such as suggested by Lee et al. may increase interest there are other factors at play to ensure the child develops effective heritage awareness. Making learning relevant and exciting to children, fostering curiosity, spontaneity, creativity, joy and motivation is the way forward for sowing seeds of awareness. When challenge and fun come together it forms 'flow', an entity that feels like play and keeps children interested, focused and engaged. However, this can only happen when the children are creators of knowledge not consumers of someone else products, whether that is through technology, or educational programmes in school or in museums. The Happy Museum project in the U.K. believe when people are consumers rather than creators, they are not invested in tackling society's problems such as climate change. They argue when people think of themselves as citizens they will participate in society, making society more resilient and stronger (Happy Museums Project 2013a). In the field of archaeology, from which this thesis draws upon in its definition of heritage, creative and playful approaches are central to good public archaeology practices and is a solution to archaeological engagement (Griffiths 2019). This thesis gives a framework for a creative and playful approach that fits the goals of good public archaeology, openness and public engagement (Griffiths 2019). However, there are tensions with a playful approach. In the field of learning and engagement play is contentious, because of the different meanings that play can hold. Tensions can arise between practitioners and scholars/educators/teachers/curators because on one hand play is seen as frivolous and not serious and not important to 'real' education (Burghardt 2010). There is a 'play-averse culture' in many schools with educators having limited understanding of exactly what play is and how it works (Burghardt 2010). This thesis design model shows how a playful approach to history and heritage can be incorporated into the school environment.

To successfully engage a child with heritage, a child-centered playful learning approach is vital. The project 'Digital Natives' as detailed in museum Exemplar A above did not stick to traditional heritage communication within the museum "where technologies are applied to existing collection and predefined heritage knowledge" (Smith and Iversen 2014, p. 255). The project took as a point of

departure in the design of a museum exhibition the everyday experiences of teenagers. Similarly in this research children were encouraged to interpret objects, sites or monuments in whatever way they pleased and their digital artefacts show how they incorporated their living culture and used museum objects as 'props for action' (Smith and Iversen 2014, p. 258). Using children's everyday engagement as a starting point was the rationale for including the online game Minecraft (detailed later in this chapter). Although children's own imaginative interpretations of museum objects into digital stories may not be considered 'history learning' in a formal history curriculum evaluation, playful learning creates an environment for children's creativity, joy, agency and curiosity to flourish and provides a theoretical framework for deeper engagement. Play and learning can happen together; the best learning experiences are when children are engaged in meaningful enjoyable activities (Resnick 2004). "The predominant emotions of play are interest and joy" (Gray 2013a, p. 18). It is hoped through playful learning deeper more engaging heritage interactions can open up children's learning on their and others heritages "in ways that enhances everyone's humanity" (Epstein 2018, p. 329). Play theory is discussed later in this chapter. Below are examples of playful learning programmes in museums.

With many museums close to the public during this current Covid-19 pandemic (ICOM 2020, UNESCO 2020a), it is difficult to deliver face to face programmes in museums. The cultural sector is in crisis as a result of this global pandemic. 90% of museums closed at the beginning of the pandemic and 10% may never open again (UNESCO 2020a). Playful museums such as Portland Children's Museum in Portland U.S. follow the Reggio Emilia learning approach of inquiry based learning. However, they and other playful museum in the U.S. such as the Children's Creativity Museum in San Francisco, U.S. are temporarily closed. Both museums have added many easy to use downloadable resources for children on their websites but it is challenging to reap the potential benefits of playful learning when children have little opportunities for social interaction. Manchester Museum in the U.K. has worked with play consultants and academics to create their playful museum (Manchester Museum 2012). Presently they are open to the public but have limitations for visitors and children. Museums have reacted very rapidly to enhancing their digital activities (UNESCO 2020a) with many other museums having to reduce their activities (ICOM 2020). Unfortunately the switch to the digital brings with it problems regarding the digital divide. Only 5% of African museums have been able to provide online content (UNESCO 2020a). During this worldwide pandemic museums will be affected in the short and long term, and will require digital learning models that they can adapt to their own contexts. Designing an adequate model is therefore of paramount importance and the objective of this research study.

## 2.7 Section Two – Learningful Play

## 2.8 The Role of Technology

### 2.8.1 Technology in education

It is widely acknowledged that education was designed to meet economic needs of a generation over one hundred years ago but there has been a dramatic change in ways of learning over the past two decades (UNESCO 2015). It is also widely known that formal education has not changed and still holds to the traditional model of over a century ago (Robinson and Aronica 2015, UNESCO 2015). Digital technologies have changed the way we find and interact with knowledge (Selwyn 2016, UNESCO 2015), which causes its own tensions in education. Although mobile technologies have become ubiquitous in people's lives, schooling and pedagogies have not changed (Burden et al. 2019a). However, digital technology is now an intrinsic part of education, and although technology and education together can be messy, complicated and contradictory, technologies are transforming the ways understandings and learning happen (Selwyn 2016). Many digital policies, initiatives and strategies have been implemented by governments to keep up in the age of digital demands.

The Irish Digital Strategy for Schools 2015-2025 aims to realise the potential of digital technologies to enhance teaching and learning, and assessment, and to develop children in active learning, engaged thinking, knowledge construction and global citizenship (Department of Education and Skills 2015). A follow-on 'Digital Learning 2020' pre-Covid-19 report encourages the continuation of these digital strategies (Inspectorate Dept of Education & Skills 2020). In 2020 the department aim to add 'Being a Digital Learner' as a key competency in the primary school curriculum (Inspectorate Dept of Education & Skills 2020). Selwyn (2016) presents the potential of digital technologies in educational change as on a continuum, from simple improvement on one end to large scale change on the other. Digital technologies are an improvement because they improve learning, by affording more authentic, social or situated learning contexts, as well as improving learners motivation, engagement and ability to learn (Selwyn 2016). Burden et al. (2019b)'s continuum points to the potential of mobile pedagogies to institute disruptive change from a conservative end to radical disruption on the other end. This thesis aligns itself on these educational change continuums and aims to improve and potentially enhance heritage engagement through the design of technology enhanced learning.

### 2.8.2 ICT, educational technologies and technology-enhanced learning environments

ICT is transforming the nature and scope of learning (Sefton-Green 2004), increasing motivation and engagement in the classroom (Di Blas and Ferrari 2014) and affording new opportunities and supports for learning and skills (Di Blas and Ferrari 2014, Sefton-Green 2004). Mobile learning has connected formal and informal education (UNESCO 2015) and can serve as a bridge between different learning contexts (Burden et al. 2019b). Technology, ICT and mobile learning have the potential to create novel interactions between children and heritage in this thesis. Technology affords new ways of exploring and expressing children's relationships with their physical settings. DBR as carried out in this thesis and detailed in the following chapter has proven its suitability as a methodology for research, and design of, technology enhanced learning environments (TELE)(Wang and Hannafin 2005). A TELE facilitates learning or skills acquisition for students with the help of teachers and facilitators, technological resources and learning support tools (Wang and Hannafin 2005).

However, there is debate whether educational technology and its use is of benefit to teachers and learners. For example in 2018 the UK Education secretary called for the tech industry to launch an education revolution for schools, colleges and universities, yet there was little take up by UK schools and colleges (DfE 2018, p. 1). There are many barriers to using educational and digital technologies in the classroom, one is teachers own lack of self-efficacy using these technologies (Archaeology 2025) as well as unproven technological benefits for students and steep learning curves. The pedagogic benefits of innovative technologies introduced to the classroom, many of which are believed to enhance learning are far from proven (Friedman and Hicks 2006, Livingstone 2012). With innovative technologies in the classroom, small, 'feasible' technological disruptions rather than too radical changes are more likely to succeed (Kearney et al. 2019).

DBR as carried out in this thesis offers a way to develop, and describe the workings of a technological model to evidence pedagogic benefits in a classroom. The benefits of research into products and processes is that there will be empirical evidence of how technology-enhanced instructional strategies scaffold student learning and support teacher needs (Friedman and Hicks 2006).

### 2.8.3 Challenges and concerns with children's use of technology

Today, children have many technologies at their disposal including smartphones, tablets, laptops, playstations, etc., all of which facilitate many applications, games and access to social media. Digital technologies are now part of every household and children grow up with connected devices from their earliest years (CyberSafeIreland 2019). Research has found dangers and risks for children of supervised and unsupervised technology use with the amount of screen time and playing of video games being of particular concern (World Health Organization 2018). Online time by children has

doubled since 2010 (CyberSafeIreland 2017a) and varies between 1 hours to over 4 hours daily (CyberSafeIreland 2019). Many governments have implemented age restrictions and guidelines on children owning phones and being active online, too much time on which contributes to children's social alienation, time wasting and addiction (Livingstone and Sefton-Green 2018). In the EU Kids Online survey report which maps the online practices, internet access, skills, online risks and opportunities for European children aged 9–16 in 19 countries there was a significant increase on use of smartphones and the amount of internet use from the 2010 EU Kids online survey (Smahel et al. 2020). In Ireland numbers of children age 8-13 own their own smartphone stands at 93% (CyberSafeIreland 2020) an increase of 25% since their 2017 report (CyberSafeIreland 2017a).

Parents are concerned about their children's use of technology and technology is changing parenting (Livingstone and Sefton-Green 2018, Turkle 2011). Parents either embrace, challenge or resist their children's use of technology (Livingstone and Sefton-Green 2018). Although parents are concerned about the impact of technology on their children they realise the necessity of digital media and its benefits (Bleeker 2020). However, in this current climate of Covid-19 life is becoming 'digital by default' which brings benefits but also increased anxieties and concerns (Livingstone 2020), online safety advice for all children is still lacking (Smahel et al. 2020) and for parents who embrace or resist technology the balancing effort on digital family life is akin to 'staying upright on a rolling log' (Livingstone 2020).

Whereas concerns on children's use of technology are valid concerns and ones that should be taken seriously, the EU kids Online report found the risk to children was shown to be less than what often reported in media or feared by parents (Smahel et al. 2020). Kumpulainen and Gillen (2017) have stated the urgent need for research in terms of minimising risks to children when online yet providing opportunities for enjoyment and learning. What is needed is to help young people to better understand the role of digital technology so as to empower them, to prepare them for problems that will arise and be better able to help themselves and others in the creation of a better digital world (CyberSafeIreland 2017a). There are many responsibilities and issues that teachers and parents need to be aware of to ensure children obtain the correct balance in their use of technology CyberSafeIreland (2017b). In this study and in the exploration of a final engagement model, an important caveat is that any facilitator or educator to be aware of the risks involved and to minimise these as a matter of priority. Equally important to note is the digital divide and to encourage learning of technology for all children. Not all children have access to computers and technology (Barron et al. 2014) and inequalities, despite global changes and opportunities in learning still prevail (Livingstone 2012). Although public institutions such as youth centres, museums, libraries etc. can work to make this fairer for all children, digital learning opportunities and activities should be embedded in formal education and the traditional curriculum (Livingstone 2012) as in the case in this thesis.

### 2.8.4 iPads as a support for learning

Mobile learning (m-learning) is increasingly employed in teaching and learning due to the ubiquity of mobile devices (Burden et al. 2019a) and is on the rise in global primary schools (Burden and Maher 2015). Applications (Apps) for the iPad and other tablets are widely available for educational purposes and can be used as a pedagogical tool for enhancing learning and engagement with subject matter. iPads and tablets are now considered a serious alternative to desktop computers (Beauchamp et al. 2015, Naismith et al. 2004) affording opportunities for personalised learning and for situated learning activities anywhere (Naismith et al. 2004).-Because of their portability iPads become learning devices both in and out of the classroom, supporting the integration of learning into our everyday lives, 'seamlessly and unobtrusively' (Naismith et al. 2004, p. 18). Mobile digital device such as iPads can serve as a bridge between two learning contexts such as a school and a local field trip, leading to more authentic and meaningful learning experiences (Burden et al. 2019b).

iPads are increasingly used to support student learning and teaching (Boon et al. 2020) and they allow children capture data and change, and re-represent knowledge (Burden and Maher 2015) in a way that is manageable and easier to understand (Maher 2015). Mobile digital devices like iPads have the potential to transform educational learning (Beauchamp et al. 2015). Using iPads in learning affords children choice and self-direction in their learning (Burden et al. 2019b) and enable the construction of knowledge and learning (Naismith et al. 2004). They help foster more active learning (Al-Bogami and Elyas 2020), afford children opportunities for expressing their creativity (Arnott et al. 2016), empower users and gives them ownership over their work (Naismith et al. 2004). In a recent literature review (Boon et al. 2020) stated the potential benefits of the iPad included developed multimodal literacies, encouraged collaboration, supported individual learning needs, motivated students learning, access information anywhere and anytime which enhances students learning experiences. However the authors find it unclear whether these benefits are as effective in practice and whether the iPads actually enhance the learning. Technologies can be a distraction in the classroom and this can cause tensions for designing innovative mobile pedagogies that support learning in the classroom (Burden et al. 2019b). However, while there are challenges with iPads in the classroom when used appropriately there are benefits (Burden et al. 2019b).

More research is needed within school subjects to analyse the effectiveness of the iPad's use for realising subject matter outcomes as opposed to traditional non-digital pedagogies (Boon et al. 2020). Whereas this thesis was interested in engagement and learning from a learner's perspective rather than assessing outcomes, outcomes are important for teachers in the delivery of the set history

curriculum. Research studies such as this thesis that show evidence for subject matter engagement and learning e.g. history, through the use of interactive technologies such as iPads can contribute to the literature on the effectiveness of iPads in the classroom.

### *2.8.4.1 Technologies in children's heritage pedagogy*

As digital media becomes more and more pervasive in our society literature shows how technology can support engagement with material culture and cultural heritage (Ciolfi et al. 2005, Giaccardi and Palen 2008). Heritage Interpretation and practices have been changed by the arrival of digital media platforms (Staiff 2014) with new media having transformative possibilities for cultural heritage; offering significant potential for accessing sites and materials, as well as affording new ways of communicating and presenting information (Malpas 2008). Research has found that new media enables personalised and participatory interactions at heritage sites as well as with online digital collection and fosters inquiry learning processes (Epstein 2018). However, there are arguments that learning is rooted in the physical or material things (Mc Grath 2016) and the digital revolution has not delivered on educational benefits or improvements to the performance of students (Livingstone 2012, Mc Grath 2016, OECD 2015).

Digital media can disrupt place and one's sense of place (Malpas 2008). Malpas reflects on what is termed culturally significant is more than just 'information', it is tied to practices, narratives, particular places and things. In Malpas view new media potentially contributes to dis-location and displacement of culture and experience. The dis-location that Newman (2015) also spoke of earlier and the cult of homelessness as Orr (2013) mentioned would indicate that technologies may have a negative effect of developing one's sense of place. However, if one does not 'know' ones' place, digital media can be the very tool that may engage a person with that place and afford 'awakenings' (Vygotsky 1967:2004) which are at the centre of what education means. Digital technologies can often mediate non-digital practices and processes and result in new possibilities (Selwyn 2016). New possibilities of heritage interaction is important for this thesis design so as the cultural heritage 'experience', mediated by technology, augments existing engagement and learning processes and practices, resulting in children's transformational perspective of their place. If a child's only encounter with place and heritage is through technology, can technology have the potential to enhance a child's engagement with place or heritage?

It is the way digital media is employed that makes a difference in learning. If a child uses digital media/technology as a passive consumer of heritage or place, there is little engagement with learning. However if the technology is used where the child has the agency in their own learning, if they can explore and construct knowledge about their place, then technology and digital media can be valuable additional tools for heritage learning. By doing so children use the computers as 'paintbrushes'



(Resnick 2006), as tools to make their own meanings and sense and consequently learn (Vygotsky 1967:2004). Mc Grath (2016) mentioned above, in his discussion on landscape learning mentions the benefits of experiential learning, community based learning, the capacity of engagement with landscape which can spark one's imagination and stimulate creativity. It is precisely this engagement and creative ways of learning that have the potential to be enhanced by employing constructionist technologies.

### 2.8.5 Making and digital making

In the past few years there has been increased interest in making (Resnick and Rosenbaum 2013). The 'making' or 'doing', practices and ideas in maker educational philosophies can be traced from John Dewey's (1938) progressivism to Seymour Papert's (1980) constructionism (Resnick and Rosenbaum 2013). Martinez and Stager (2013) have pointed to the beginnings of the maker movement in the works of Dewey, Piaget, and Montessori. In essence, making is experimenting, playing around, and is an iterative type of exploration and engagement where makers (children) are exploring new paths and possibilities and continually reassessing their goals (Resnick and Rosenbaum 2013). Digital making is a creative process of creating products or digital artefacts (Sutch 2013). Papert, whose educational philosophy was child-centered advocated for children's learning through creating, designing, exploring and playing around with technologies. A key theorist in this DBR study he believed when learners are consciously engaged in making a public entity (e.g. a digital artefact) they are building knowledge structures (Papert and Harel 1991). His work is seen as the 'intellectual inspiration for the maker movement' (Resnick 2020, p. viii). Although using computers to make is a form of creative expression for children, and one which Papert advocated for, his central focus was not on the 'machine but on the mind' (Papert 1993, p. 8). Papert's theory, detailed in chapter three is known as constructionism and shares constructivism's meaning of learning as building upon knowledge structures.

However maker activities are 'out of favour' in formal education with emphasis on curriculum and quantitative assessment (Resnick and Rosenbaum 2013). If Papert was alive today, he would be frustrated with current educational practices and see current initiatives as technocentric (Resnick 2020). Development of technological skills were not Papert's goal but ones of technology supporting and finding new ways of learning for children. The making process aligns with Papert's beliefs, it is messy and a bottom-up process that is the opposite of formal education lesson planning and structure; this may be a reason for its discouragement in a classroom (Resnick and Rosenbaum 2013). However, many authors have called for the integration of 'maker' practices into formal education acknowledging that teachers and schools need sustained support in order to achieve this goal (Godhe

et al. 2019). Making, doing, tinkering, are all firmly aligned with play (Resnick and Rosenbaum 2013). There are many benefits of making include richer learning experiences. Making is ideal in a playful learning environment which affords the freedom for exploration and engagement. Children learn how to think, adapt, iterate and improvise in changing and uncertain situations, these skills are core to children's success in the future (Resnick and Rosenbaum 2013). In the context of a playful approach to heritage education the maker philosophy, the making, the doing, the expressing of oneself is the act of making meaning. When it is personal it is embodied. Making, creating and expressing ourselves are what make us feel whole and the things that we make 'embody portions of our soul' (Hatch 2013).

### 2.8.6 STEAM Pedagogy – a boundary

I have not applied STEAM pedagogy to this thesis. In a recent review of the STEAM literature Perignat and Katz-Buonincontro (2019) found confusion on the practices of STEAM education, definitions of STEAM and what the 'A' for Arts means. The Exploratorium Museum where part of this research was carried out could be considered one of the first STEAM museums in the world. However, they do not call themselves a STEAM museum or refer to STEAM on their website. The Exploratorium value Science and Art equally, both are of equal value in their mission of transformative learning. In a recent review of the STEAM literature, Perignat and Katz-Buonincontro (2019) found not every educator is comfortable with integrating artistic practices into existing STEM pedagogies. The artistic process is very much associated with the creative process, in that exploration, play, problem solving, perseverance, risk taking are part and parcel of creating work and this artistic process is often overlooked by non-arts educators who implement the arts to foster creativity (Perignat and Katz-Buonincontro 2019). In this thesis, the creative arts are highly valued in their own right in the enhancement of children's engagement with heritage. Therefore, learningful play and its concept of fostering of creativity through using technology was considered more in line with the ethos of this thesis, as opposed to STEAM pedagogies (after Perignat and Katz-Buonincontro 2019).

### 2.8.7 Video Games and learning

In 2003 video games were just at the very beginning of their potential (Gee 2003). By 2006 more than three quarters of US youth had video-consoles and 40% played a video game daily (Gee 2006). By 2018 95% of 13-17 year olds had access to smartphones, 84% owned video-consoles and 90% said they played video games (Pew Research Center 2018). Young people enjoy playing computer games because they are engaging (Squire 2005), interesting (Malone and Lepper 1987), fun (Anderson et al. 2010), exciting (Malone and Lepper 1987) and challenging (Squire 2005) which makes them ideal for use in education. Although much research has been done since the 2000s between videogames and learning (Cipollone et al. 2014, Gee 2011b, Ortiz et al. 2015), more work needs to be done to gather

convincing evidence on their benefits (Gee 2011b) as research questions still remains on the effectiveness of video games for learning (Ortiz et al. 2015). Teaching and game integration in the classroom is still an unexplored area in the literature (Kangas et al. 2017) with few studies on game-based pedagogy for teachers (Shultz Colby 2017).

Many of us hold bias towards games (McGonigal 2011) and believe video games are antisocial (Shaffer et al. 2005) include violent aggressive behaviour (Connolly 2011, Gee 2003, Shaffer et al. 2005) gender stereotype (Connolly 2011, Gee 2003), foster misogyny (Shaffer et al. 2005) and stifle creative play (Connolly 2011). Many educators dismiss video games (Shaffer et al. 2005) and within educational institutions video games can be viewed negatively. They are considered time wasters and contain violence (Gee 2003, Shaffer et al. 2005), reasons which are often used as excuses by policy makers, politician and academics who are reluctant to change the status quo (Gee 2003). There is a perception that games that are fun are not conducive for learning (Connolly 2011). Yet games present a range of learning opportunities including exploration, expressing oneself, playful experimentation within social boundaries, and meaning making (Shaffer et al. 2005). There are well-founded concerns about video games and game based learning but in the context of education they can be of positive contribution to learning of a subject matter (Dindler et al. 2010)

Learning from video games requires a different thinking than what is taught in schools (Gee 2003) and offer potentially powerful new ways of learning in schools (Shaffer et al. 2005), additionally addressing within a formal schooling system the digital divide (Gee 2004). Playing video games have increasingly become part of life for many people (Ortiz et al. 2015), and youth are no exception. When children are playing video games they are learning something (Shaffer et al. 2005) and this way of learning is particularly powerful in the classroom when learning activities are social, experiential, meaningful and epistemological at the same time (Gee 2012, Shaffer et al. 2005). Enhanced learning experiences are not the only advantages of game-based learning; young people display increased engagement (Dindler et al. 2010), motivation, improved student retention and achievement (Connolly 2011).

There has been a tendency in the last few decades to integrate learning, supported by educational theories with game-based approaches (Malegiannaki and Daradoumis 2017)(after Ortiz et al. 2015). Shaffer et al. (2005) ground their design of learning environments that includes games within learning theories appropriate to the digital age such as constructivism (Connolly 2011) experiential, active and situated learning (Ortiz et al. 2015) and problem-based learning (Connolly 2011). To learn effectively, Gee (2004) advocates for the post-progressive pedagogies such as Ann Brown (founder of DBR methodology) that combine well-designed guidance and immersion. The type of learning (includes ways of doing, being, and seeing within activities and experiences) which works

well in video games needs to be scaffolded and situated. Knowledge is gained through activity and experience rather than as information and facts to be tested (Gee 2004). At the same time Gee (2004) has found for school assessment concepts and facts are easy to grasp when young people are involved in activity and experiential learning (Gee 2004).

There are some heritage professionals and archaeologists who believe video games are problematic in representing the past even if research has shown the thinking about, the doing and presenting the past in video games are powerful ways of learning (Copplestone 2017). The rise of digital technologies are changing our experiences with cultural heritage and is evident in the literature in terms of augmented reality, 3D, virtual reality, mobile and videogames. Although cultural-heritage videogames have been around for the past 20 years (Copplestone 2016) and have been found to be beneficial for maintaining and communication intangible heritage (Mortara et al. 2014) there is a dearth on literature on the use of games that focus on the notions of accuracy of cultural heritage games (Copplestone 2016), on supporting historical learning or teaching, or on enhancing museum visits (Anderson et al. 2010).

History as stated earlier is found to be a boring subject in school for some children as it concentrates on the content rather than the 'doing' of it (Gee 2011a). Video games have the potential to engage young people with history and heritage and revive interest. By playing a video game and having fun in the process, by choosing something students want to do and like they are engaged and learning. This is the ethos built into the design of the interventions in this thesis. Garrelts (2014) points to the transformation of the videogame culture by the sandbox multiplayer video game *Minecraft*. It was hoped the video game *Minecraft* and all its affordances would be the core of lasting engagement for children with their cultural heritage.

### 2.8.7.1. *Minecraft*

What is *Minecraft*?

Released in 2009, the game *Minecraft* is hugely popular with gamers. As at May 2020, 200 million copies of *Minecraft* have been sold worldwide million and there are 126 million active users (Minecraft



Figure 2-1 *Minecraft* Block

Wiki 2020). *Minecraft* itself is a sandbox game about "placing blocks and going on adventures" (Mojang 2018). A sandbox game is an open ended free play digital game. There are many types of editions of *Minecraft*, from *Pocket Edition* for phones and tablets, to Desktop, PlayStation, and Xbox versions and to an educational licensed format *Minecraft Education Edition* for use in schools

(Minecraft Wiki 2020). Different versions have different costs and restrictions. The Pocket edition was used in this study, each iPad licence costing €6.99. However, the basic game is the same in all versions. As a game users can place blocks on blocks and build towns, cities, worlds etc. (Fig. 2.1). Worlds can be populated by villagers and animals, all composed of building blocks. Many of the descriptions of Minecraft refer to the similarities with LEGO building blocks (Brand and Kinash 2013, Fanning and Mir 2014). Within the game, there are no instructions or directions how to play the game. There are simple graphics and no violence (Garrelts 2014). There are several game modes and settings to allow for different users experiences and which are left to the user to decide upon. Users can modify (called modding) the game and share their created worlds, these two elements have contributed to the games success (Garrelts 2014). There are two main modes of playing the game and include what is called the creative and survival modes. Creative mode, the mode used in this research is in effect a blank slate and a child's world must be built (crafted) and imagined from scratch. Players have unlimited access to blocks, animals and characters. In effect it is free and open ended play, either solo or collaborating with other users. Survival mode on the other hand is more popular as it is more exciting. A player is stranded and they must craft and protect themselves from monsters. The creative mode of *Minecraft* has been used in many collaborative projects around the world with individuals helping to build:

- the British Museum (British Museum 2014)
- imaginary 'Tate worlds' connected to the themes of Tate Museum's artworks (Tate Museum 2015)
- the country of Denmark (Høeg Nissen 2014)
- Scotland and Northern Ireland as part of the *Minecraft Map of Great Britain* (Ordnance Survey 2015)

Additionally the United Nations run a programme which involves youth participating in urban design while building in Minecraft and aims to foster civic engagement in young people (UN-HABITAT 2015). In 2016 the Museum of London built a replica of the city of London before its great fire in 1666. In 2017 the de Young Museum in San Francisco augmented the user experience in its Teotihuacan exhibition. In London the V+A museum held online workshops for the re-design of its building in 2017.

How Minecraft is used in the classroom

MincecraftEdu, the educational arm of the company, now owned by Microsoft emphasises *Minecraft* for the teaching of many subjects including the sciences and the humanities and include subject kits on their website Minecraft.net. The website hosts additional teaching resources specifically aligned to the Australian curriculum ACARA. Minecraft's use as an educational tool is increasing (Nebel et al.

2016, Short 2012). The game has shown educational benefits for teaching and learning of specific subject matter (Brand and Kinash 2013, Short 2012, Steinbeiß 2017) and a powerful medium for achieving curriculum development goals (Barab et al. 2009). It has been used to enhance teaching of maths, science and history amongst others and been referred to as a 'game-changer' in development of scientific literacies and instruction (Short 2012). As a game it is designed to be a story generator and because of its simplicity it allows users work together, build and create things and design their own worlds (Schell 2020). Most studies on Minecraft in the classroom show the benefits from the perspectives of the teachers rather than the students leaving what Steinbeiß describes as a gap on the students' perspective (2017). In this study the Minecraft perspective was only from the students and contributes to this gap in research.

### Minecraft and playful learning

As mentioned earlier, there are valid concerns over the negative effects of videogames. Even though Minecraft has crossed over into the educational domain it is another cause for debate regarding the benefits of technology to children (Livingstone and Sefton-Green 2018). However it is evident that Minecraft affords positive creative open-ended constructive play and fosters social interaction. A good video game has human learning core to its design (Gee 2003) and in the designing of Minecraft educational experiences, students have opportunities to construct knowledge through group problem-solving, creativity, critical thinking and conflict resolution skills (Brand et al. 2014) as well as through exploration and free play. In the 1960s Lego educational sector developed ten 'Principles of Play' which included unlimited play potential, fun, development, imaginative and fostering creativity, these principles relate to Minecraft today (Fanning and Mir 2014).

### Minecraft and learning theories

As described in the introduction chapter, I was determined that Minecraft would be a key technology to employ in this research. It allows for constructing, creating and building of an artefact, in this case the heritage of children's local areas. It aligns to the maker philosophy, constructivism and constructionism as well as to play theory and creative learning. As opposed to other educational software which has pre-designed interaction paths, Minecraft empowers constructivist learning as students decide their interaction paths (Brand et al. 2014). Students can interact with each other in their worlds and make meaning together, in the process constructing knowledge (Brand et al. 2014). Minecraft is steeped in nineteenth century pedagogies, notably those of Pestalozzi, Froebel, and Montessori who have contributed to current knowledge on the interrelationships between play, building and learning (Fanning and Mir 2014).

## Chapter Two Literature Review

Design-based research examples of Minecraft in education

Steinbeiß (2017) using a DBR methodology carried out six interventions and created a model for formal and informal learning with Minecraft. In his study with 16 students carried out over 3 months he used observations, video data, interviews and a survey. His findings indicated Minecraft enhanced learning experiences in both formal and informal learning environments (Steinbeiß 2017). In his model his students had 24 hours access to Minecraft, which was different to *TEChE* set-up. With the young age of the class and parental possible concerns it would not have been an option to have open server access which, having the freedom and time, has been found to be advantageous in exploring a topic (Nebel et al. 2016).

Brand et al. (2014) used DBR in their research in a Minecraft project that recreated their university campus. Similar to this thesis they used the creative mode in Minecraft and found play to be crucial aspect of constructivist theory. Additional findings found Minecraft to be a distinct tool for providing students opportunities to contribute to and transform knowledge while interacting with each other and all through constructive play (Brand et al. 2014). The authors also allude to their students work and Huizinga's (1950) ideas that play offers separation and uniqueness from the familiar world. Similarly children in this research, are afforded authorship over their interpretation of the world they are building with Minecraft, they were free to build imaginative places whether in their medieval city or their local heritage sites/monuments. In this study Minecraft moved beyond the usual classroom pedagogy. It provided affordances not only for constructivist and constructionist learning but also for self-directed and playful-learning processes.

Benefits of, and challenges with Minecraft

There are many benefits to using Minecraft in education as well as challenges. As mentioned above Minecraft is adaptable to learning every subject (Nebel et al. 2016) which includes history and heritage. The opportunities for playful learning are evident in the literature. In the case of playful learning, being present in a concept rather than seeing a concept or a virtual world can be transformative (Barab et al. 2009). As modifications to the game are encouraged the game can be adapted by users to meet their needs. Extra add-ons and customisations like changing looks, costumes, texture etc. can be purchased cheaply and these possibilities offer further benefits to the game allowing focus on the content or topic (Nebel et al. 2016).

Limitations of Minecraft include a steep learning curve for the more advanced features. Skilled players can become frustrated if playing collaboratively or having to play on a pocket edition or in a creative mode rather than the more challenging survival mode (Nebel et al. 2016). Many teachers, educator, facilitators may not have the specialist skills needed for the set up for Minecraft in the classroom or in an informal setting, and this affects the learning with the game (Nebel et al. 2016).

There can be technical issues, server issues, lag (slow network connections), and potential harmful play by the users (anonymous chat, destroying of others worlds etc. can occur when players are together on the same servers). Data loss may occur if worlds or servers crash, therefore researchers have to monitor their experiments to safeguard data (Nebel et al. 2016). Another limitation is the cost of Minecraft, whereas pocket editions are free, full editions cost more and licensing is required in schools if using MinecraftEdu.

Young people are learning informally in new ways. The nature of Minecraft can lend itself to the formal learning environment, once the learning curves and potential technical issues are overcome. Building blocks of Minecraft can produce knowledge depending what the blocks represent (Brant et al 2014). Children in this study used the blocks to build physical representations of their local heritage, imagining and recreating castles, town walls, and medieval life within. In the playful learning process, engaging children with games that are of relevance to them it is possible for learningful play to be present. Knowledge is created within the theoretical framework of constructivism and the building of public entities affords constructionism learning theory (Cipollone et al. 2014, Fanning and Mir 2014), the theories of which are detailed in chapter three.

### 2.8.8 Storying cultural heritage through digital storytelling

#### *2.8.8.1. The development of story and digital storytelling*

Humans have been telling stories for millennia and have passed down lessons, values, morals and beliefs through the art form of oral histories. Story is at the core of human activity (Lambert 2010) and has served as a technical tool over millions of years to give a measure of order to societies (Egan 1989). People made meaning of their world through narrative (Bruner 1990), although understanding is not guaranteed through narrative, and there are also many other ways of 'knowing' (Staiff 2014). However, we do derive meaning from the relation of expressions and words to other expressions or words (Bruner 1986). These words together form a narrative, and narrative forms stories. Sequencing events and ordering experience through narrative has a more lasting effect on humans than collections of concepts and facts (Turner-Bisset 2005). When people share experiences and narrative with each other, they develop knowledge (Liguori and Bakewell 2019). This is important because creating stories about heritage will develop new knowledge for children. Additionally, with the increased use of technology, including digital media in a story-making process brings a new dimension to learning from, and with, stories (Liguori and Bakewell 2019).

DST first came to prominence in San Francisco Bay Area in the 1990s. Bay Area artists were keen to explore how digital media tools could empower people in personal storytelling (Storycenter 2015). A curriculum was refined by the group and 'Digital Storytelling' community workshops were



carried out. By 1998 the group evolved into *The Centre for Digital Storytelling (CDS)* based in Berkeley, California, and in 2015 the group became known as *StoryCenter*. Currently, they carry out global workshops and training in pursuit of giving voice to people and in creating change. Joe Lambert, one of the co-founders created a digital toolkit to assist people with creating and sharing digital stories. In Lambert's *Digital Cookbook* (2010) he came up with seven steps that form the basis of a digital story which he encourages users to adapt.

Today, DST is commonly defined as taking the oral form of storytelling and mixing images, music, audio, graphics together with people's personal tales (Davidson and Porter 2005). The outcome is a video, usually between two to three minutes in duration (Lambert 2010). Students develop the topics, add music, visual images and audio of their choosing to their stories (Lowenthal 2009, Vinogradova et al. 2011). As they become creators of multimedia rather than passive consumers (Ohler 2006) this makes the DST process meaningful and of genuine interest to them (Vinogradova et al. 2011). This is of interest to educators who are seeking to engage learners with their personal narratives.

### *2.8.8.2 Digital storytelling's relevance to education?*

Since the technology revolution of the 1980s and given the centrality of storytelling to people's lives, it is not surprising to find DST becoming of interest to educators (Ohler 2006). DST has become a worldwide phenomenon, has grown in popularity, and is practised in schools, museums, libraries community centres and more (Robin 2018). It offers education a 'great deal', including writing, critical thinking and media literacy (Ohler 2006). DST is educational (Davidson and Porter 2005, Di Blas and Ferrari 2014), collaborative and a social process, and has become a particularly powerful technology tool for classroom activities (Graham and Liguori 2019) and for classroom engagement (Lambert 2012). It has become a key part of curricula (Lambert 2012). Although not fully touched on in this thesis, DST can be powerful for telling personal stories. Meanings are deeper (Porter 2015), facts and information are brought to life (Liguori and Bakewell 2019, p. 68) and when the narrator uses their own voice meaning and power is given to those stories (Benmayor 2018). The power of a story can contribute to successful classroom learning (Egan 1989) and when students are given opportunities to express themselves, their emotions and reflect upon their DST projects, the learning process is enriched (Lambert 2012) and children's understanding of curricula content is increased (Sadik 2008). Whereas DST can help children figure out new ways to tell stories (Kahan 2003), scaffolding is needed as many students do not have the technical know-how to enhance their stories (Ohler 2006). Care must also be taken to ensure the focus is not on the technology but on the stories (Ohler 2006).

In schools, DST is used to create stories in numerous topics (Robin 2018). Writing is an important part of the DST process (Xu 2010) yet it is difficult to encourage written tasks in a classroom

(Hall 2018). The addition of digital tools add positive aspects to traditional literacies (Tackvic 2012). DST facilitates four student-centered learning strategies; reflection (deep learning), engagement, project-based learning and technology integration into subject matter (Barrett 2006). There is evidence for the DST process having an impact on student's motivation, learning and engagement (Barrett 2006), and creativity (Garzotto et al. 2010, Hall 2018, Ioannidis et al. 2013, Tackvic 2012). Creativity is jump started when children have access to images and visuals in the DST process rather than a blank page (Tackvic 2012). DST is particularly suited to constructivist learning environments, where students construct their own meanings through selecting and researching their topic, writing the narrative, collecting images, recording their voiceovers, and using computer-based tools (e.g. iPads) to create their stories (Robin 2018).

Digital storytelling exemplars in the classroom

Several examples of its effective use in the classroom can be identified in the literature. One example is of an European Erasmus Project carried out concurrently to *TECHe* called DICHE (Digital Innovations Cultural Heritage Education) (Liguori and Bakewell 2019). The project brings together the three fields of cultural and heritage education, digital integration and innovation, and primary education of which the authors point out are rarely interrelated in European teaching practices (DICHE 2018). Their aim was to combine digital resources and cultural heritage education in primary schools (DICHE 2018). The consortium developed a theoretical framework for the use of digital tools in cultural heritage education and devised sets of online resources for teachers for use in the classroom. Their study differs from *TECHe* in that their focus was on developing 21<sup>st</sup> century skills whereas in this thesis, children will develop skills but the focus is on heritage engagement.

In the United States, Hernández-Ramos and De La Paz (2009) contrasted a group of eight graders experiences learning of history. One school completed projects in a traditional non-digital manner, and another school created multimedia stories. It was found that the DST experience facilitated significant gains for content knowledge and historical thinking skills for the pupils concerned as compared to the non-digital school (Hernández-Ramos and De La Paz 2009). Further afield, in New Zealand, an example of employing DST as a methodology for teaching of history in tertiary classrooms can be found in Coleborne and Bliss (2011). Their study illustrates how students adapted traditional ways of presenting historical research into new ways of carrying out and presenting historical knowledge. They found new ways of 'doing' history, in an interdisciplinary context, enriched history as a discipline. This is important in the argument for 'doing' history and making the subject more interesting for children. Di Blas and Ferrari (2014) carried out a five-year study to test the benefits and indirect benefits of DST in Italian schools. Their study evidenced improvements to student's skills, knowledge and attitudes from the perspectives of the teachers. Motivation, learning, engagement and using ICTs were all interrelated in their study which they state

were the driving forces for the many benefits of the DST process. They concluded that regardless of the quality of the results of DST projects, the positive educational impact lay in the process of creation itself. In this *TEChE* thesis the focus is not on high quality digital artefacts by the children. Similar to this Italian study when children create, they make their own meanings, learn and engage. In an earlier 2010 study, Di Blas et al. (2010) focused on collective DST with thousands of pupils (aged 4-10) in a large-scale Italian storytelling schools project. This study is important for the *TEChE* framework as it was carried out under similar theoretical frameworks of constructivism and constructionism. Additionally, the study provides evidence for the need for scaffolding for children, engagement and fun as inter-dependent concepts in transforming digital stories into effective learning experiences (Di Blas et al. 2010). Another smaller Italian schools project was carried out by Garzotto and Paolini (2008) with 24 children (aged 10-11) with an aim to achieve educational goals using a chosen technology and educational activities. Garzotto and Paolini (2008) studied the interactions between technology, educational activities and existing classroom tools and the effectiveness of building a series of artefacts for their collective stories. Improvements were noted in content knowledge, multimedia skills, dialogic, reflective and critical thinking. Their study was expanded on to become an annual competition in Milan schools, the PoliCultura Italian DST competition with a reach of 7620 pupils in 2009 (Di Blas et al. 2009). What is interesting in this educational technology design study is the theoretical perspective of 'experience' is broadened where the process is deemed as important as the educational technology pilot prototype, in the benefits they bring to the educational setting. In another study by Doering and Henrickson (2015) carried out with 95 children called 'WeExplore', the research blended place, inquiry and experiential learning and aimed to foster creativity through what the authors termed adventure learning. Storytelling was an important element of their WeExplore model. The study found that opportunities for self-directed, inquiry-based learning fostered creativity in classroom learners (Doering and Henrickson 2015). With the addition of technological devices, apps and software, inspirational learning spaces were created (Doering and Henrickson 2015). Similarly with the *TEChE* project, creativity is an important aim. This paper provided knowledge on the mix required to foster conditions for creativity using place and DST. All of these classroom exemplars illustrate the potential of this pedagogic approach.

### Digital storytelling exemplars in the museum

There are numerous resources and DST toolkits available for museums and cultural institutions. A European Commission initiative, *Europeana*, is a European best practice network with an aim to make cultural heritage more widely accessible (AthenaPlus 2015). A project they carried out provides recommendations and guidelines for cultural heritage institutions in how to carry out DST projects. Many museums employ DST in their learning and cultural heritage programs. The museum as a

community space is suited to communities creating their heritage-based narratives and storytelling (European Commission 2014). Whereas museums already tell stories through their objects, storytelling in museums is confined mostly to descriptive academic prose (Roussou et al. 2017). Similarly with cultural sites and collections meanings are communicated in the same didactic manner (Roussou et al. 2017). Museums can be uninteresting to people because they do not make relevant connections to visitors personal narratives (Pujol et al. 2013), although many museums employ narrative as a means of giving voice to those left out of the historical record (Bedford 2001). Museums face many challenges including attendance (Ioannidis et al. 2013) and how to make cultural heritage more interesting to new and younger generations (Pujol et al. 2013). This is important to note as if cultural heritage institutions such as museums wants to include people's concerns and experiences in any programmes, they must find new models of communication and ways of developing cultural knowledge (Smith 2010). Reaching out to new audiences is challenging in light of a museums competition for children's attention, the edutainment industry (Ioannidis et al. 2013, Pujol et al. 2013). To reach, and appeal to audiences, one of the strategies museums have embraced is DST to links aspects of education and entertainment (Ioannidis et al. 2013). Not only does DST makes cultural heritage sites and content more interesting, it effectively conveys to audiences, cultural knowledge interpretation and analysis (Pujol et al. 2013). Whereas schools follow a set curriculum, museums are not obliged to do so within their learning programs. Therefore it is important that the prototype design model in this research, which crosses the formal and informal learning environments has the correct balance of the formal and informal education and learning to effectively suit both learning environments.

Many museums and heritage sites create opportunities for personalised storytelling experiences and explore new storytelling approaches (Bedford 2001). Roussou et al. (2017) created a prototype mobile storytelling experience that explored an emotive type of storytelling at archaeological sites. As part of the *EMOTIVE EU* project (2016-2019) the study developed methods and tools around 'emotive digital storytelling' (Roussou et al. 2017). Their prototype storytelling experience at the Ancient Agora in Athens, Greece, was designed to strike emotional chords with visitors, to view the archaeological ruins in a different manner and to instil curiosity about the site's significance (Roussou et al. 2017). Foregrounding emotions in their design prototypes their pilot study provides possibilities for connecting visitors to heritage and enhancing their experiences (Roussou et al. 2017). Affective interactions with heritage plays as important a role as cognitive interactions with heritage. Key to this thesis is for children to have embodied experiences in their place, through physical interactions with local materiality. Physical, embodied, sensory and active experiences induce thought on heritage and support cognitive processes (Van Boxtel et al. 2016).

## Chapter Two Literature Review

CHESS (Cultural Heritage Experiences through Socio-personal interactions and Storytelling), an EU funded research project (2011-2014) aimed to enhance peoples museum experiences through their mobile phones by exploring personalised interactive storytelling and DST methodologies (CHESS 2016). However, they found issues with aspects of DST within the museum such as taking images in a public space and the use of headphones so as not to disturb visitors (Ioannidis et al. 2013). Practical challenges in public spaces can be challenging, especially when dealing with children. Therefore a design to encourage DST in a museum setting should address these ethical and practical considerations.

Many museum examples of DST are mostly for individuals (Roussou et al. 2017). One collaborative study example was carried out in one of the world's leading museums, the Smithsonian institute, U.S.A. (Rappoport and Liguori 2018). Liguori, a member of the DICHE consortium mentioned above spent four months furthering DST as a methodology through intergenerational community groups and community college workshops. Although the study was based around cultural heritage, and more specifically a sense of place, the overall aim was to enhance the 4C's (Communication, Creativity, Critical thinking and Collaboration) similar to the European DICHE project.

Garzotto et al. (2010) ponders whether DST can move from fun museum experiences to promoting authentic learning. One such example of creating a fun authentic learning experiences is through a cross-context DST experience that combined a visit to the U.S. National Archives in Washington, D.C. with the classroom (Greenhut and Jones 2010). 90 seventh graders used their own mobile phones to capture documents and archived material and furthered their research back in the classroom, created stories and shared those stories with a public audience. The National Archives considered it a novel experience for the students and a move away from traditional museum-type scavenger hunts. As students explored the archives, higher order skills such as synthesis and evaluation, engagement, critical and historical thinking skills were noted by the institution (Greenhut and Jones 2010). Mobile technologies supports authentic learning experiences (Burden and Maher 2015), and this thesis shows how these learning experiences can be fun. Children have learnt about their local heritage or history 'in a funner way' (child, S2.4), immersed themselves in a hybrid (physical/digital) experience, from which they made a digital story to share with others. This is a way forward for authentic heritage learning.

It is evident from these examples, that DST has potential for engagement with heritage. The emphasis of approaches in the literature are aimed at improving digital skills and competences (Di Blas and Ferrari 2014, Greenhut and Jones 2010, Liguori and Bakewell 2019, Rappoport and Liguori 2018), content knowledge (Di Blas and Ferrari 2014, Garzotto and Paolini 2008, Hernández-Ramos and De La Paz 2009), educational goals (Garzotto and Paolini 2008), creativity (Doering and Henrickson

2015, Tackvic 2012), emotion as a means of engagement (Roussou et al. 2017), self-efficacy (Xu 2010) rather than looking in depth at how it can encourage and enhance children in communicating with, constructing, and creating meaningful local heritage experiences. It remains unexplored if technologies, particularly constructionist technologies, where children make and create artefacts and personal narratives, could help engage children more deeply with their own heritage.

### *2.8.8.3 Historical truths versus narrative freedom (facts versus fiction)*

In today's world of fake news it is a concern over what are facts and what is fiction and the lines between the two continue to blur. To counteract fake news and populism history education has become increasingly urgent in today's world (Grever 2018). Whereas facts are 'intersubjectively established' and they represent a 'provisional truth' facts in the historical record can be contestable, unverifiable and incomplete (Grever 2018). However, it is important in the history curriculum that young people are encouraged to critically think for themselves in order to distinguish between historical fact and fiction (Grever 2018). Regarding the use of historical facts in this research, children were given historical and archaeological documentation to work into their narratives but freedom of interpretation was encouraged within those narratives. In his study Palombini (2016) pointed to the problem of combining historical truth and narrative freedom. The study advised when constructing cultural heritage narratives and stories not to go against historical documentation and to use simple dynamics to fill action gaps between historical events (Palombini 2016). However, in this study, historical critical thinking skills were not the aim, affective heritage engagement as much as cognitive is considered important. The positive affect that physical, embodied, sensory and active experiences afford children induces thought on heritage and supports their cognitive processes (Van Boxtel et al. 2016). Key to this thesis is for children to have embodied experiences in their place, through physical interactions with local materiality. The tangibility of the sites in itself are bridges to the past, and the power of this type of engagement with objects, or indeed sites is how materiality arouses emotions (Dudley 2010). Positive emotions and affect are key themes in this thesis to enhance cultural heritage learning and engagement. Therefore open creative interpretation of facts is preferred in the life-lasting, deeper meaningful engagement of children rather than being constrained to existing narratives.

## 2.9 Play and Creativity

### *2.9.0.1 The importance of play*

While there is considerable research on play itself over the last 100 years (Burghardt 2010), there is less on playful approaches in both museums and schools, and fewer still within the heritage sector. Research has been carried out and in multi-disciplinary fields (Ailwood 2003, Meckley 2015) including

anthropology (Gray 2009), biology, education, folklore (Sutton-Smith 2008), psychology (Gray 2013a, Sutton-Smith 2008), sociology, and art (Escobedo 1996) to name but a few. Huizinga in 1938 described play as necessary in the development of culture and society (1950). Civilisation, Huizinga states 'arises and unfolds in and as play' (1950, p. ix). Play has been an important part of human development since prehistoric days of the hunters and gatherers (Gray 2009). Today, within hunter-gatherer and other traditional societies, play is their social structures and their means of education (Gray 2009). The 1989 UN conventions of the rights of the child in article 31 states how children have a right to engage in play and participate freely in cultural life and the arts (UNCRC 1989). Being involved in a community's cultural life is important for children's sense of belonging (UNCRC 2013), it forges their own sense of identity which the global report states contributes to enlivening and supporting cultural life and traditional arts. In 2013 the UNCRC found there was still poor recognition of children's rights to play and reiterated the importance of States to provide sufficient play opportunities for children, specifying the important link to creativity (UNCRC 2013). Additionally, in 2014 the international Play association raised concerns over the rights of children to play (IPA 2014). The principles of the Irish governments Play policy builds on the National Children's Strategy (2000) and the United Nation Convention of the rights of the Child (1989). This national play policy on has eight objectives outlining the different play aspects e.g. raising awareness of play's importance, outdoor, playground, hospital setting, training and qualifications, public play (Department of Children and Youth Affairs 2004). It includes guidelines for schools to promote play for children in the schoolyard and the classroom.

### *2.9.0.2 What is play?*

We know what play is or at least we think we do. We can easily recognise the construct of play when evidenced through actions, activities and interactions (Smith and Vollstedt 1985). Yet, it is a difficult concept to define (Burghardt 2010, Sutton-Smith 2008), with little agreement between theorists on a common definition (Sutton-Smith 1997). Schechner (1993) has suggested scholars should declare a moratorium on defining play as it is undefinable and all definitions are ideologies. This interdisciplinary ambiguity often leads to problems for researchers when comparing studies and developing shared understandings (Burghardt 2010, Meckley 2015). All disciplines have their own frameworks for understanding play (Sutton-Smith 2010) and as this study is carried out in the domain of education, the theoretical understanding of play is derived from a developmental perspective as detailed in the theoretical framework chapter regarding Piaget and Vygotsky. It is well regarded that play is vital in the cognitive, emotional and social development of a child (Bruner et al. 1976, Gleave and Cole-Hamilton 2012, van der Aalsvoort and Broadhead 2016). The difficulty with understanding play is it cannot be framed into one definition but can be understood as a set of actions or activities (Bruner et

al. 1976). A definition that is widely quoted in the literature is from the culture and play theorist Huizinga. Play is:

a voluntary activity or occupation executed within certain fixed limits of time and place, according to rules freely accepted but absolutely binding, having its aim in itself and accompanied by a feeling of tension, joy, and the consciousness that it is different from ordinary life

Huizinga (1950, p. 28)

Key aspects of this definition include play characteristics core to the ethos of this study (voluntary free participation, agreed upon activity with time and place constraints, self-chosen, self-directed occupation, intrinsic motivation, positive affect as in being joyfully occupied, being absorbed as in flow in a non-stressed atmosphere).

### *2.9.0.3 Complexities and challenges of play*

Play is not always welcomed with open arms. The word itself, 'play' holds certain negative connotations in that it is seen as the opposite of work (Sutton-Smith 1997), or a diversion from responsibility (Gray 2009). Within education it can be perceived as frivolous and not conducive to learning (Caillois 1958:2001). Yet play can move along a continuum to becoming pleasurable work (Dewey 1916). It is as Sutton-Smith explains a

special kind of antipathetic existential duality, characterized often by the notion that play contains both good (fun) and bad (waste of time) elements

(Sutton-Smith 2010, p. 110)

Many authors have discussed the paradoxes in play; how play is spontaneous but has rules; serious but not; imaginary yet about the real world; childish but powerful for adults' accomplishments (Gray 2017). A major contradiction of play lies in its triviality, yet it is a powerful way of learning (Gray 2017).

### *2.9.0.4 Decline in play and its implications*

Children's free play with others has shown a sharp decrease over the last fifty years (Chudacoff 2007, Gray 2011). There are several reasons for this decline. There have been many changes in society and with increasing urbanisation parents are afraid to allow their children outside (Gray 2013b, Whitebread and Basilio 2013). Additionally, many parents work longer hours and this social change mean there is less time for accompanying children outside to play. Many families are concerned with academic prowess and improving grades, therefore their children are timetabled with extracurricular activities (Chudacoff 2007, Gray 2013b) and have no time for free play. Within school time, creative arts are being reduced in favour of STEM subjects and those that can be of economic value; even in kindergarten, play is sacrificed for more academic time (United States Congress House Committee on Natural Resources and Subcommittee on Fisheries Wildlife 2007). When a child is deprived of play it



has serious negative consequences for their futures. There are serious effects on their psychological development, mental health issues such as AHDD and anxiety, depression and narcissism (Gray 2011, Gray 2013b). Unfortunately it is the children with little family support who suffer the most from play deprivation (Gray 2011). Therefore for these children, it is vital school plays a part in providing playful opportunities in the curriculum, benefiting their social, cognitive, emotional development.

### *2.9.0.5 Play-based learning approaches – a gap between theory and practice*

Play is ‘the most natural way’ children learn (Moyles 2010) and is powerful way of learning (Golinkoff et al. 2006, Moyles 2010). When children start early education, in many countries early childhood curricula are grounded in play-based approaches such as *Aistear* here in Ireland (National Council for Curriculum and Assessment 2009). However, by time a child gets to primary school, increasingly academic learning outcomes are emphasised over play-based learning (Breathnach et al. 2017). Although child-centered approaches list free choice and free play as central to play-based approaches, they are ‘at odds’ with educational policy frameworks (Wood 2013). Therefore tensions arise in schools between play-based approaches and the goals of the curriculum with many educators holding different interpretations, values and beliefs on play (Martlew et al. 2011, Moyles 2010, Wood 2013). Further tensions include many teachers finding a lack of support for play-based pedagogies (Breathnach et al. 2017) as well as constraints such as parental expectations, curriculum and policy pressures, space and time, rules and adults’ role (Wood 2013). Equally many teachers lack confidence in their skills to provide good quality play experiences (Hunter and Walsh 2013). Furthermore, there is little literature on children’s perspectives on their everyday classroom experiences, which means educators do not have the research to support engagement and agency in the classroom (Breathnach et al. 2017). When teachers seek to integrate play into their school curricula the word ‘play’ can be problematic (Sahlberg and Doyle 2019) and is avoided (Burghardt 2010). There is a gap in understanding ways in which to support teachers and educators with playful learning which this thesis hopes to address.

Integrating technology into playful learning can cause tensions as some teachers are concerned using technology with young children (Edwards 2015). On the other hand, technology, that is playfully explored, with adult scaffolding has the potential to broaden play experiences (Yelland 2015). Technology introduces children to multimodal learning which leads to new forms of self-expression, to make meaning and show their understandings. In a ‘Playful Explorations’ study by Yelland (2015) with kindergarten children, she found the use of iPads supported types of play such as group (social) and solitary play, enabled conversations between children themselves and with adults, enabled qualities such as persistence and self-regulation, and was a springboard for further exploration and discovery.

Play has been integral to the informal learning context of the museum and one that sets it apart from other informal leaning settings (Luke et al. 2017). Many museums are playful and run activities and events for children, schools and families. However, the lack of a definition of play is problematic for the sector (Luke et al. 2017), shared definitions are complex and conceptualisations of play are different everywhere (Luke et al. 2017). There is a need for research in museums on what play is and its importance to the sector, which would also develop a common language around play and generate new theories (Luke et al. 2017). Research at the moment in children’s museums focuses on play interactions between parent and child, or parents perspectives on play (Luke et al. 2017). As mentioned earlier and the struggle museums find between entertainment and education it is important play is taken seriously as Luke et al. have found in their research play not ‘fully appreciated’ (2017). In 2012 Manchester Museum initiated a museum-wide project to make their museum more playful with an overall aim to enhance children’s well-being (Lester et al. 2014). A growing sense of playfulness within the museum emerged from the project although not without its problems, such as staff questioning the value of a play-based approach in terms of learning outcomes, balancing the needs of other visitors, and concerns over playfulness’ relevance to the collections (Lester et al. 2014). However, well-being and intrinsic cultural value was believed to be more important than interactions with the objects (Lester et al. 2014). Sharing their design for a playful museum, Manchester Museum developed a handbook of rules. In it they point to the general lack of play definition, the different cultural understandings of play, the different way children will manifest play and the roles adults, how educators can facilitate playfulness in themselves, and foster playful dispositions in children (Manchester Museum 2012). Going forward, Manchester Museum have ‘disturbed’ traditional ways of interacting with children, and they hypothesise future well-being in both visitors and staff as a result of their changed ethos (Lester et al. 2014). In this thesis heritage and place-making have been found to enhance well-being.

Providence Children’s Museum in the U.S. initiated a project to explore conversations around play and learning called *Learning about Learning*. The project investigated caregivers’ beliefs on play and learning in the museum with an aim to understand how children learn through play. They found caregivers could articulate the benefits of play to their children but it was challenging for some to articulate the connection between play and learning, although they agreed the children were learning (Letourneau et al. 2017). Children’s own beliefs on whether they are learning through play are important. In a separate museum study Letourneau and Sobel (2020) found children do understand play and learning can coincide allowing them recognise playful activities afford them the opportunity to learn. Another example of a play-based approaches in the UK is the *Playful museums* programme which runs each February across museums to encourage engagement of under 5s with the museum

and their collections. It holds a series of events and activities and training for museum staff. The Exploratorium Museum and the Children's Creativity Museum in San Francisco are playful museums, with both offering professional development for teachers in order to bring creative skills and learning back to the classroom. In the *Happy Museums* U.K. project, Derby Museums ran the Re:make *the Museum* project which engaged communities via 'head, hands and heart'. People embraced the maker philosophy as they designed and made silk culminating with a new gallery exhibition '*Notice Nature, Feel Joy*' (Happy Museums Project 2013b). In Ireland, there is one museum, *Imaginosity*, that focuses on interactivity and playful learning. Due to the current pandemic with museums closed, and lack of opportunities for children to socially interact, organisations are beginning to publish material to support playful learning at home; one such Australian example offers guidelines for play time at home (Emerging Minds 2020).

### *2.9.0.6 Exemplar: Pedagogy of play – Project Zero*

In *Project Zero* at Harvard University, Mardell et al. 2016 devised a pedagogy of play in order to bridge the gap between pedagogy and play. The research centre in collaboration with LEGO in Denmark explore with teachers the role of play in schools and develop understandings and strategies for playful learning practices (Project Zero 2015). Mardell et al. (2016) developed indicators of what play looks and feels like, with three over-arching and over-lapping categories, *Delight*, *Wonder* and *Choice*. In their playful learning framework, these categories aim to describe the learner's experience of a playful learning environment. When all three categories are in play, playful learning is happening (Mardell et al. 2016). This framework was published the same year as DC1 and therefore not discovered until after the relevant interventions. However, it proved a useful framework for mapping children's data to provide evidence for playful learning.

## Chapter Two Literature Review

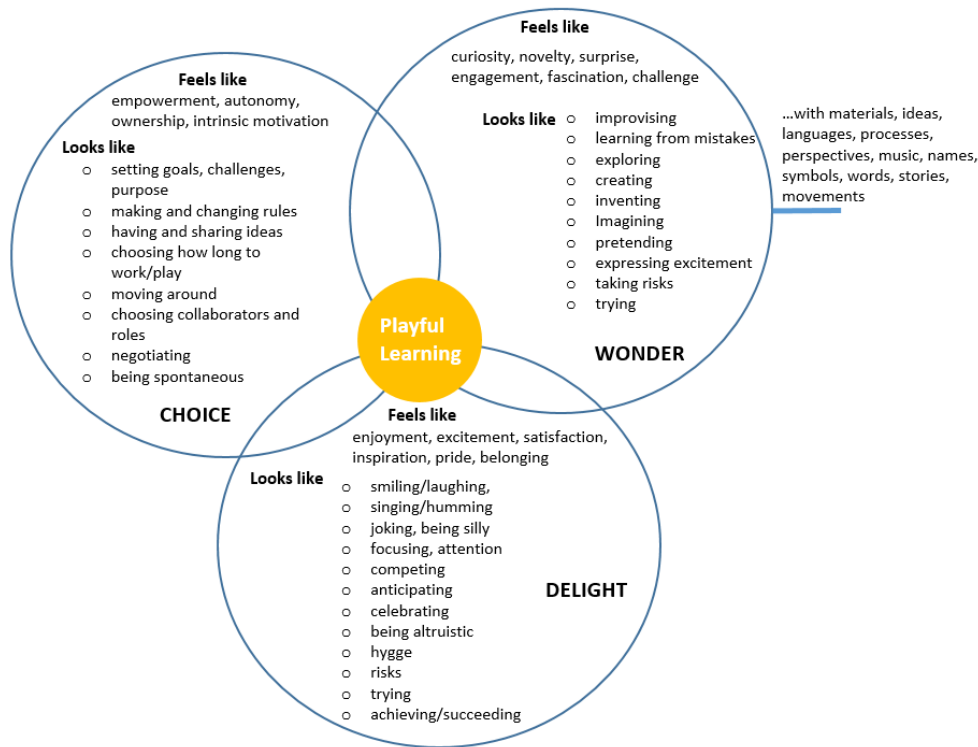


Figure 2-2 Indicators of Playful Learning: (International School of Billund 2019). Developed by Pedagogy of Play at Project Zero, Harvard Graduate School of Education. This work is licensed under Creative Commons Attribution- NonCommercial 4.0 International

### 2.9.1 Play and its relationship to creativity

Today, more than ever we need creative people. As the present Covid-19 pandemic has shown we need to be adaptable and flexible, in our personal and working lives. Children need to become creative thinkers, and play fosters that creativity (Barnett 1990, Lieberman 1965). However, Russ and Doernberg (2019) question whether play develops creativity or whether it reflects creative processes. I agree with (Kozbelt et al. 2010) perspective in that one supports the other. Play allows for creative processes to flourish. When the conditions are right, creativity is sparked. A playful learning environment that encourages openness, risk taking, freedom, choice, ambiguity, challenge will provide the 'zone' for creative processes to begin and the development of creative confidences. The link is positive affect. It is crucial to play and is vital for creative process (Isen et al. 1987, Russ 1993). Most research in creativity has been in the cognitive domain (Russ 1993), but is beginning to change and include the affective domain. Isen et al. (1987) refer to earlier research in the 80s where positive affect is perceived to reduce cognitive capacity, leading to lazy problem-solving. However, their studies found positive affect promotes creativity and a person in a happy affective state may be more creative than others. The concept of 'Flow' is outlined in the theoretical framework chapter and involves cognitive-affective interactions. Cognitive challenges and positive affect, together, are core to flow which itself fosters creativity.

### *2.9.1.2 The importance of creativity*

Creativity is an important form of human capital and one all children need for their future lives in adapting and solving future unknown challenges (Csikszentmihalyi 1996, Runco 2014). Additionally, developing children's creativity is known to be important for their learning (Craft 2012, Runco 2014). As children construct knowledge, creativity is a core requirement of that learning process. However, creativity is not considered core components of primary school curricula (Voogt and Knezek 2018), is undermined by curriculum constraints (Cooper 2018b). Within formal education there often is a gap between policy intentions and actions (Henriksen et al. 2018). Many governments, including our own foster the growth of creativity in children through national creative programmes such as Creative Youth and Creative Schools (Creative Ireland 2017b). The Creative Schools programme is very similar to the Heritage Schools programme where artists/heritage practitioners go into the school and deliver programmes and support the development of the arts within the school and community. Creativity is encouraged by the Irish government as creativity is important for children's future work skills and for future economies and lives of children (World Economic Forum 2020); with this in mind young people's ability to conceptualise is deemed more important than gaining knowledge (Department of Culture Heritage and the Gaeltacht (2017). Additionally, in Ireland creativity is encouraged because of its positive impact on individuals, communities and national well-being (Creative Ireland 2017b). Becoming creative is developing a creative mindset. Lucas (2016) refers to creative capabilities and the habits of mind (dispositions), ways of thinking and acting, which creativity fosters; creativity can help children develop into creative thinkers, needed for their future learning and lives. The interventions in this project although about heritage learning and engagement are well positioned to develop creative dispositions in children.

### *2.9.1.3 What and where is creativity?*

Many adults and children hold a deep-seated belief they are not creative when "in truth they have never learnt and practiced what is involved" (Robinson 2011, p. 166). A creative act, no matter how small or infrequent can be experienced by anyone (Guilford 1950). Many myths are associated with creativity such as it's about the arts, self-expression, or only special people are creative (Glăveanu 2018, Robinson and Aronica 2015). It is no wonder that many people don't think they have any creative abilities at all (Robinson 2011) yet everyone has creative capacities (Boden 2004, Robinson and Aronica 2015) and the challenge is to develop them (Robinson 2011). However, for those that do not believe they have innate creative capacities, creativity can be learned and taught (Rhodes 1961,

Robinson and Aronica 2015). This is important for children to know as when we believe we are not something, e.g. creative, this perceived deficiency become real and children's learning and identity are negatively affected (Papert 1993).

An academic interest in creativity only began in the 1950s with the psychologist Guilford calling for research in the area (Rhodes 1961). Rhodes explored creative definitions in 1961 and found 40 definitions, all related and forming part of four strands known as the four P's (person, process, product, press (relationship between humans and their environment)). However, today there is difficulty with, and no set definition of creativity (Runco 2014) although most take into effect novelty, utility and surprise (Simonton 2012). As an example, Robinson's definition of creativity is "the process of having original ideas that have value" (Robinson and Aronica 2015) as is the UK National Advisory Committee on Creative and Cultural Education definition 'Imaginative activity fashioned so as to produce outcomes that are both original and of value' (NACCCE 1999). Schools have no set definition of creativity which makes it difficult for teachers to teach or integrate with their curriculum (Lucas 2016). As Csikszentmihalyi (1996) points out nobody knows if a thought is new, unless it references some standards or if something is of value, unless it passes social evaluation. While many definitions of creativity stress 'value' to a domain, what is the value on a child's work? All children can be creative and their work/product/outcomes can be creative for their age group (Russ and Doernberg 2019); the value for children may be sharing their work with peers. Therefore, to Csikszentmihalyi (1996) creativity is not internal to one's mind but happens "in the interaction between a person's thoughts and a sociocultural context" (Csikszentmihalyi 1996). Many authors have written on their interpretations on the types of creativity. Boden (2004) has noted two different senses of being 'creative', one sense is P-Creative and the other H-Creative. P (psychological) means having an idea novel and surprising to you, but which is not new to the world; H (historical) means having an idea that is novel in the history of humankind. Another distinction is between small c- creativity and large C- Creativity. Developmental theories of creativity start with the mini-c, which are more novel, in the moment (Lucas 2016) subjective forms of creativity (Kozbelt et al. 2010), move towards products/artefacts as the more mature and tangible forms of creative expression (Kozbelt et al. 2010) that change some aspect of a culture (Csikszentmihalyi 1996). In this thesis children's ideas and creations may be of the mini-c and P-Creative types and although their artefacts may not be of 'value' to society they are still of intrinsic value to themselves and a worthwhile endeavour.

2.9.1.4 Creativity learning models

Resnick based his book 'Lifelong Kindergarten' (2017) on the ideas of Seymour Papert whose focus was on children, learning and creativity (Resnick 2020). Within his book, Resnick explains about the MIT research group who encourage creative learning experiences in the context of *Scratch* the computer programming programme for children. To help the children develop as creative thinkers Resnick lists four guiding principles: *projects, passion, peers* and *play*. Similar to the ethos of this thesis Resnick (2017) believes the best way to foster creativity is to support children to work on projects they are passionate about, with peers and within a playful atmosphere (p. 16).

Resnick (2007a) has developed a six-step creative process model for children called the *Creative Spiral for Learning* (Fig 2.3). Here, the creative process is visualised as a spiral, as children

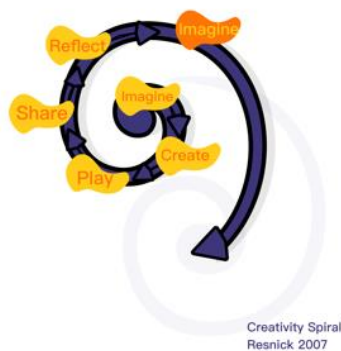


Figure 2-3 Creative Learning Spiral – After Resnick 2007a

work through the spiral they start by imagining what they want to do, they create something based on their ideas, play around, tinker with their creations, share their work processes with others, reflect upon their experiences - which leads them back through this iterative type spiral looping to re-imagining new ideas and creations (Resnick 2007a). Another creative learning model is from Lucas (2016). His model of creativity is used in the Australian curriculum (ACARA) and Ireland's *Creative Schools* programme (Lucas 2016). It has 5 core creative habits, *Inquisitive, Persistent, Collaborative, Disciplined, and Imaginative*.

2.10 Drawing it all Together – Learningful Heritage Play

Children's opportunities for using their minds in creative ways does not generally happen when engaging with basic academic subjects (Csikszentmihalyi 1996). What is needed is to afford children the opportunities to develop as creative thinkers through exploration, experimentation and freedom to express themselves (Resnick 2020). Learningful play affords these creative learning opportunities. Learningful play relates to children learning, with others and through technology in a playful, positive, engaging, environment. Learningful heritage play can be defined as learningful play incorporating heritage interactivity. Many of the elements in learningful play are interrelated. Like a web, all elements affect each other. The literature has shown how play equates to learning (Bruner 1986, Singer et al. 2006) equates to creativity and creative learning (Russ 1993, Sefton-Green et al. 2011) all which equates to engagement (Rice 2009). A playful learning environment is crucial to foster flow.

Flow experiences afford optimal pleasure in learning, and this is more likely when a person is motivated (Csikszentmihalyi and Hermanson 1995). For a child to be motivated positive affect is vital. It is widely understood social interaction is crucial for learning (Vygotsky 1930:1978), yet when teams don't get on together, it does not provide opportunities for optimal learning for those children. Although technology improves socialisation and interaction between students (Resnick 2020), it can also cause tensions between children and whereas children may be learning and constructing knowledge, if the learning is not as enjoyable as it could be, it is not as engaging, which means it is not a learning that lasts (Papert 1993). Engagement is core to a good learning experience (Stockmayer and Gilbert 2002). When all the individual factors come together learningful play is happening. But how this can be best designed in practice remains fuzzy and unknown and forms the basis of this research.

### 2.11 Chapter Summary

Section One of this chapter presented the complexities of, and challenges with definitions of heritage and place. The relationship of heritage and place-making with meaning-making, identity making, and developing a sense of belonging and place was explored. I then outlined challenges and debates in the field. An overall shift from traditional understandings of heritage to a social construction of heritage is evident in the literature. I outlined the current educational system in Ireland and showed how children currently interact with heritage within Irish and European contexts, often through the lens of history. I have detailed the research on place-based education. I have discussed where heritage is placed within the curriculum and how the museum interacts with the curriculum. I have outlined how the local is important for learning. I have shown my interpretations of what constitutes heritage, heritage engagement, and heritage learning from the perspective I practiced within the thesis and the gaps that merit further investigation.

The role of technology in children's lives was examined. Examples of playful and technological practices in museum and schools were detailed and novel ways of interacting with heritage learning was introduced. I examined the concept of play and its relationship to creativity. The overall literature review gives a background to the different elements that come together to form learningful play and learningful heritage play.



## Chapter 3 Theoretical Framework

This chapter outlines the conceptual framework for the *TEChE* (Technology-enhanced Cultural Heritage Education) design model. At the beginning of the research these interrelated concepts are fuzzy but become clearer as they evolve into the *TEChE* prototype design model outlined in chapter seven. This chapter details the underlying learning theories that inform the framework for this research.

3.1 Outline of Conceptual Framework

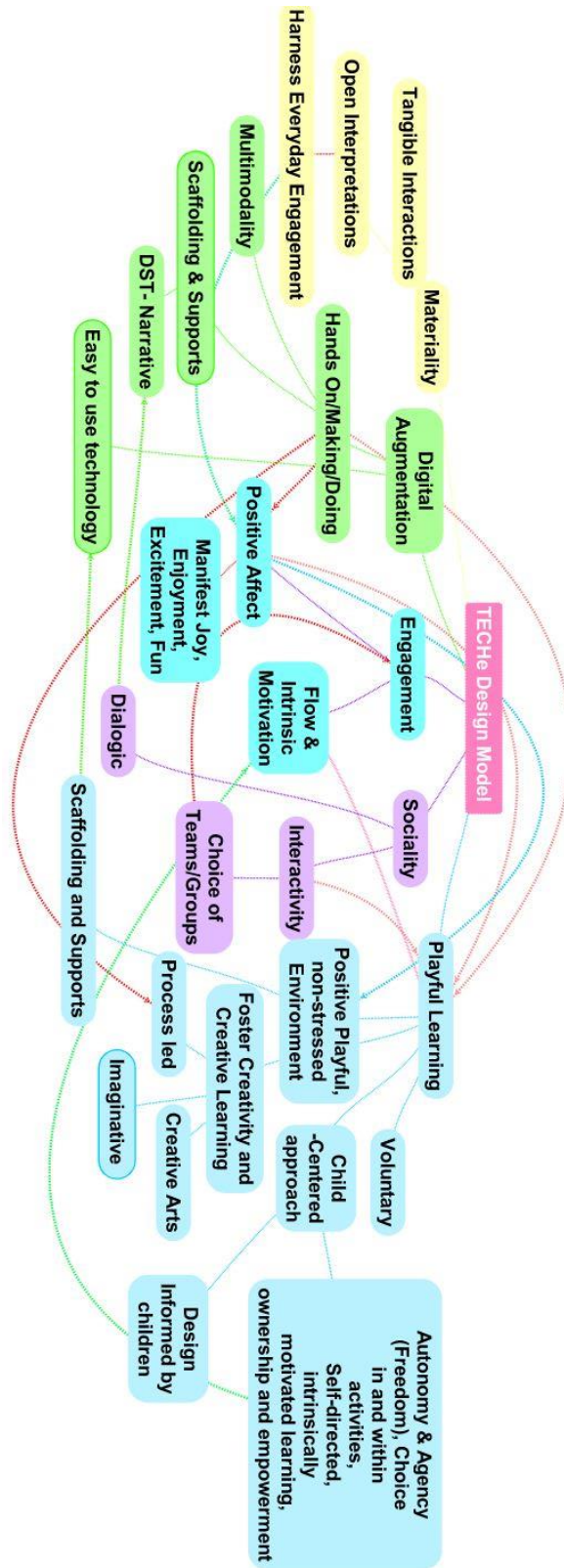


Figure 3-1 TEChE Prototype Design Model

The conceptual framework for the design model *TECHe* is guided by the literature and laid out as five high level lenses of engagement above (Fig. 3.1). The purpose of five high level lenses of heritage engagement is to guide the evolving design across the three design cycles and the seven intervention sites. A refined design model with a set of design sensitivities will be the result of these interventions. This model aims, through a process of iteration, to produce a pedagogically strong adaptable and adoptable design model, suitable for use in both the classroom and the museum. The five lenses of engagement are categorised under two over-arching themes. Many concepts are interrelated and could be categorised under alternative lenses, e.g. positive affect is categorised under engagement but is central to playful learning. Creative expression is categorised under digital augmentation and is also central to playful learning. DBR which is outlined in the following chapter allows for the shifting of perspectives in the conceptual framework that may arise as the design evolves in order produce the optimal design for heritage learning and engagement.

### 3.2 Two Overarching Themes

#### 3.2.1 Materiality

The first overarching theme is related to cultural heritage and materiality. Whereas materiality can have different meanings depending on disciplinary backgrounds and philosophical understandings, in this thesis, the scope and character of materiality refers to a heritage interaction continuum that spans from the physicality of material culture, landscape, physical environment, cultural heritage sites (tangibility) and museum based objects to meaning making and constructivism (intangibility). Because of tangible heritage's dominance on the school curriculum it serves as entry points for heritage engagement. The aim is for children to have embodied experiences in their place, through physical interactions with local materiality. As materiality affords potentially multiple changing meanings, no physical place, objects can hold the same meaning for everyone. Therefore, it is important in this thesis that there is dialogue around heritage and place-making and that children form their own interpretations. The child produces the meaning, not the site (Staiff 2014). It is also important in the interpretation and understanding of heritage that interpretations can span from the material to the constructivist dialogic end of the continuum (Fig. 3.2). This 'span' or space between physical form and meaning is what Dudley calls materiality, where dynamic interactions of both take place with a person's sensory experience (Dudley 2010). Carman describes the tensions between the two continuum ends as

## Chapter Three Theoretical Framework

*apparently contradictory, but nevertheless linked, directions: that heritage is inevitably more intangible a phenomenon than tangible, and yet that its intangibility needs to attach to something tangible in order to exist at all*

(Carman 2009)



Figure 3-2 Heritage Interactions Continuum

### 3.2.2 Learningful Play

The second overarching theme outlines theories that underpin the TEChE learningful play framework. They include constructivism and constructionism.

#### 3.2.2.1. Constructivism

Constructivism is an educational philosophy that relates to the construction of knowledge through an individual's real-world experiences which results in learning. Learners build new knowledge upon previous learning and construct their own knowledge rather than passive transmission from a teacher or a text book. It is through prior experiences that individuals make meaning and make sense of their world. Through decades of educational research, constructivism has shown the processes of how people learn, concluding it is through learners own interpretations and meaning making; this meaning making is 'pedagogically significant' (Hein 1999). Constructivism can be traced back to classical antiquity to John Dewey, Jean Piaget and Lev Vygotsky. There are two major theories in the development of constructivism. Firstly, the theory holds (1) an individual cognitive perspective from Piaget, and secondly (2) a social process perspective from Vygotsky.

(1) Piaget believed knowledge is constructed, within a child's individual internal mind. Piaget believed children learn in 'sequential order' according to their stages of development, with each child having the same 'level of evolution' of intelligence (Gulati 1980b). His central research concern was to know how knowledge and the structures of intelligence are formed (Gulati 1980a) and he is known for his two schemes on how to internalise knowledge. The first one is *Assimilation* and the second structure is *Accommodation*. With the former, assimilation occurs when a stimulus from the child's external world acts on or changes behaviour only to the extent it is integrated with prior internal structures (Gulati 1980c, p. 42). Assimilation is determined by the subject. With the latter, accommodation occurs after assimilation and is applied to a particular situation; whatever is assimilated must be adjusted to suit the specific circumstances of the situation (Gulati 1980c, p. 42).

Accommodation is determined by the object. There is a dynamic relationship between assimilation (subject) and accommodation (object), knowledge is gained through the interaction between subject and object (Gulati 1980a, p. 19). There is an 'equilibrium' which Piaget terms 'adaptation' between the two schemes (Gulati 1980c, p. 42). Adaptation as a term is deemed a 'whole' between the two poles of subject- assimilation and the pole of object-accommodation. Therefore, Assimilation and Accommodation cannot be disassociated from each other (Gulati 1980c).

(2) The focus on the individual and the social differentiate the learning theories of Piaget and Vygotsky. Piaget believed a child's development preceded learning. Vygotsky believed the opposite to Piaget in terms of learning and development. 'Good Learning' precedes development (Vygotsky 1930:1978). With Piaget, the social context is characterised as an input to learning mechanisms, a separate entity rather than an integral feature of a child's learning process. Social context is deemed secondary in the development of the child's mind. To Vygotsky the 'social dimension of consciousness' is primary and the 'individual dimension is derivative and secondary' (Vygotsky, 1978, p.30). In social-constructivism, Vygotsky's theory was that children learn from others, through participation with peers or an adult facilitator that provided a *zone of proximal development (ZPD)*. In a ZPD, meaning making is socially constructed, development is mediated through this social space rather than through the perspective of Piaget where a child's makes meaning individually.

Important to this study is the different theoretical perspectives of learning and constructing knowledge in schools and outside of schools. Resnick (1987) found in schools the dominant form of learning is individual, external cognitive tools are not normally used, symbols are used to learn, and learning is generalised; in informal settings, learning happens with or through others, tools are used for learning, learning is contextual and situated. Whereas Piaget's theory is prominent in schools (Egan 2012) the school focuses on individual cognitive learning (grades etc.) whereas museum learning is situated and context specific. Museum learning has moved to a more constructivist, meaning-making, dialogic model of learning (Falk and Dierking 2000, Hein 1998, Silverman 2010).

### Social constructivism

In this research I employ a social constructivist approach, a Vygotskian cultural psychological frame of reference. Vygotsky examined how learning is affected by social environments and concluded learning is a collaborative, social process and meaningful learning includes social interaction (1930:1978). In social constructivism understandings of the culture, symbol systems and context are important in constructing knowledge (Kim 2001). These cultural tools include language (dialogue), which Vygotsky called the tool of tools (1930:1978); conversation mediates learning and teaching and

the co-construction of knowledge (Ash 2003). The underlying philosophies related to social constructivism (Kim 2001) include: learning is a social process (Dewey 1897, Vygotsky 1930:1978), reality is constructed through human interactions and knowledge is culturally and socially constructed (Vygotsky 1930:1978).

### Zone of proximal development

Children learn from others, either with support and assistance from adults or from their peers. The space between a child's assisted and unassisted performance is where Vygotsky's Zone of Proximal development theory is situated (Tharp and Gallimore 1988) and is considered a powerful form of learning (Thompson 2013). The zone of activity is where learners navigate through with the help of others, which is not limited to people alone but to artifacts and tools such as in a technological environment (Brown et al. 1993). Parents, families, friends, teachers and the community provide a vital role in defining types of interactions between a child and its environment (Kozulin et al. 2003). They are transmitters of culture to a child. The ZPD affords child development, with the help of an adult or other more skilled children that is slightly beyond the capability of the child (Vygotsky 1930:1978). The definition of a ZPD is:

*the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers.*

(Vygotsky 1930:1978)

Vygotsky's believed cognitive processes occur first on a social plane (interpsychological), then are internalised to form the individual perspective (intrapsychological) (Vygotsky 1930:1978). Therefore, children learn the prevailing culture through more experienced members of that culture (Rogoff 1990, Vygotsky 1930:1978). Children observe and participate and come to understandings through the help of others, which would be impossible for them to learn on their own (Rogoff 1990). A ZPD can be created for any situation where a learner is mastering a practice or understanding a topic (Wells 1990). Vygotsky thought of play as a ZPD (Vygotsky 1933:1978). Play provides a proximal development for the child and allows them through imagination and creating social rules to reach higher level of psychological functioning (Moll 2014). In play Vygotsky stated, the child behaves older than his/her age and is a 'head taller than themselves' (Vygotsky 1933/1966).

On a ZPD developmental continuum, there are two levels, the *actual* and the *potential*, the unfolding area of maturation in between is the ZPD. The *actual level* is the level of learning a child is at as a result of their completed developmental stages (Vygotsky 1930:1978). The *potential*

*developmental level* is the level of maturation in learning the child is capable of achieving with the assistance of others. However, (Moll 1990) points to the lack of specifics regarding the form of a ZPD beyond general prescriptions about collaboration, direction, and assisting “each child through demonstration, leading questions, and by introducing the initial elements of the task's solution” (Vygotsky 1987, p. 209). Therefore there are differences in how the ZPD is approached, for example one approach is a whole class example where the ZPD determines the level at which instruction is pitched (Wells 1990). Other classrooms may have a ZPD in individual groups. However, in these examples children's interests and goals are typically not part of the instructional plan. According to Wells (1990) to create valuable learning opportunities educational activities must be relevant and meaningful to children. In that case the ZPD is interpreted differently, it is individual, and is created in the interaction between the learner and his/her peers in an activity, taking into account the practices, available tools and quality of the interaction as much as the child's highest capability. In this case, it is possible to see what modes of interaction lead to effective learning (Wells 1990).

### *Stages of a ZPD*

Within the ZPD there are four stages (Tharp and Gallimore 1988):

1. *Assistance from others peers that are capable or more knowledgeable others (MKOs)* – while carrying out a task, the adult or peers assistance role lowers as the child's grasp with the task and the learning matures;
2. *Assistance provided by one's self* – responsibilities of the task are taken over by the child and they carry out the task without help. Children's performance although unassisted at this point may not be fully automatized (developed), learning continues through self-direction and self-guidance;
3. *Automatisation (Development) through practice* – this is the developmental stage, the ‘fruits’ of maturation and development (Vygotsky 1930:1978), the task has moved from other to self and has been internalised and automatised. Assistance from others is no longer needed, and at this stage assistance is considered disruptive or interfering;
4. *De-automatisation*; learners ‘reiterate’ through the previous three sequences, learners move through the process from other-assistance (internalisation) to self-assistance (automatisation) in the development of new capacities and new skills.

(Tharp and Gallimore 1988)

As can be noted through the four stages of a ZPD, to help children learn, children must be assisted in their performance (Tharp and Gallimore 1988), and guided in their participation. Therefore, in the design of this study, means of assisting performance as outlined by (Gallimore and Tharp 1990) will need to be included in the learning processes. They include “modeling, contingency, managing, feeding back, instructing, questioning, and cognitive structuring”, and more specific to this study are the features modeling (behaviour one can imitate and which provides standards), feedback (accuracy important), instructing (assisting the learner transition through the ZPD) and questioning (assistance questioning rather than assessment questioning) (Gallimore and Tharp 1990). Additionally, the Instruction should be aimed at the proximal level, where children’s developing abilities will realise with help from others (Vygotsky 1930:1978). However, Tharp and Gallimore (1988) caution on the level of assistance. If offered at too high a level, then it is considered disruptive and interfering. In the context of schools, effective teaching can be seen to take place in a ZPD when it assists a child’s performance in the ZPD. At the intersection of when the child requires assistance and when assistance is offered this is the point at which effective teaching occurs (Tharp and Gallimore 1988). The concept of ZPD is important to understand for educators when facilitating in collaborative learning environments so as children can reach their full developmental potential. Features that can help with guided participation are intersubjectivity and scaffolding.

### *Intersubjectivity*

Underlying guided participation is intersubjectivity. Inter subjectivity is development of shared understandings derived from a shared focus and purpose between learners in a learning environment; it is a process that involves social, emotional and cognitive interactions between people (Rogoff 1990). This research aims for children to experience intersubjectivity providing further opportunities to extend their understanding of history/heritage.

### *Guided participation*

Guided participation can be confused with scaffolding. However, it is a process of bridge building (Rogoff 1990); on one side is what children know and on the other new information for learning (Rogoff 1990). Cognitive development “occurs through guided participation in social activity” (Rogoff 1990, p. vii) with both guidance and participation vital in the development of children’s thinking (Rogoff 1990). When children collaborate in activities their understandings are transformed through their own participation. Guided participation supports children and structures their participation in activities; in the process transferring to the children the responsibility for management of their cognitive development (Rogoff 1990). An example of guided participation practices is the pedagogical



approach 'cognitive apprenticeship' of Brown, Collins & Duguid (1989); the authors recognise how knowledge is situated and is a "part of the activity, context and culture on which it is developed and used" (Brown et al. 1989, p. 32). The model challenges formal learning practices which they state are individual and concepts that are abstract. Cognitive apprenticeship model aims to change learning in the classroom to more authentic practices through social interaction, activities, connections to everyday familiar activities and to "honor the situated nature of knowledge" (p. 32). For this thesis, whereas children in museum interventions are benefiting from situated, authentic, contextual learning, it is important for children in the school interventions to make deliberate use of local physical heritage places, to embed learning in social activity for effective learning to take place.

### *Scaffolding*

Scaffolding emerged as part of social constructivist theory and Vygotsky's theories on the ZPD. The term 'scaffolding' originated with Wood, Bruner & Ross (1976) who defined it as a process "that enables a child or novice to solve a problem, carry out a task or achieve a goal which would be beyond his unassisted efforts" (Wood et al. 1976, p. 90). It is a dynamic process as it involves individual ZPD's and the scope of tasks within the developmental zone (Yelland and Masters 2007). The scaffolding process supports children's learning and as they become more independent in their learning and thinking the scaffolding can be reduced allowing the child to complete their activities on their own. Wood et al. (1976) listed features of scaffolding (from an educator's perspective) to aid instruction. They include gaining the attention of the child, reducing tasks to manageable limits, guiding the direction of task solving, controlling a child's frustrations and demonstrating the task (p. 99). Technology, as a tool in itself is a scaffold (Yelland and Masters 2007). Technology can provide scaffolded effective learning experiences as Hall and Bannon (2005) found when their research explored the digital augmentation of a museum exhibit with primary school children. Technology as a scaffold is important for this research in guiding creative actions in the process of constructing knowledge. In this research scaffolding is designed for every intervention. This includes worksheets, storyboards, warm-up games, brainstorming activity sheets, treasure hunts, heritage activity sheets. Archaeological handouts and information are written for the reading age of 10-12 year olds and handed out as needed. iPad folders for the *TEChE* project include all the apps and links to the website. Examples of scaffolded activities can be found in the relevant design chapters.

### *3.2.2.2. Playful learning approach*

A playful pedagogy has shown in the literature to benefit children's learning and development. Play-based approaches in education can be traced back to Dewey's learning through 'doing' and through experience, Piaget's stages of development, Vygotsky's zone of proximal development, Froebel's approach where children learn through direct experience of play (Fröbel 1909) and Montessori's constructivist playful learning approach (Lillard 2013). Playful pedagogies such as explored in this thesis are guided by the literature and by models and indicators of playful and creative learning. However, playful learning in practice may not always align to the literature, there are always cultural or environmental differences within playful learning contexts (Whitebread and Basilio 2013). There will be children who do not like taking a risk, do not want to be there, or find it challenging to be in a space where judgment is suspended or where learners are uncomfortable being open in their thinking and actions. Within this research's play-based approach there is time and space given for curiosity, discovery and social interaction. Play-based pedagogies incorporate other strategies other than play which include, demonstrating, questioning, dialogue (Moyles 2010) which is important for this research. Scaffolding is important within playful learning, where the facilitator or adult support can give feedback and encouragement. Encouragement of the child's curiosity and endeavours extends their learning (Martlew 2011). Scaffolding is particularly necessary for children when learning with technology, supporting them technically, cognitively and socially (Yelland 2015).

Playful learning environments allow children freedom and choice. Giving children voice, listening to their concerns, and including their feedback into the evolving design is important ethos of this research. Additionally, children having autonomy, empowerment and creative confidence are features of this play-based approach. Creativity is central to a playful pedagogy, it helps children develop and express their understandings, values and concerns (Alderson 2008). The United Nations convention on the rights of the child (UNCRC 1989) highlights the rights of the child to freedom of expression (Article 13). Therefore adapting to the ways children express themselves is important to incorporate, not only for the benefit of children but also to support an authentic model of heritage engagement.

This study drew on theorists whose types and characteristics of play have relevance for this educational study (Table 3.1). Burghardt (2010) states all of his characteristics/criteria must be present in some form to be play, Gray states the more of the features of his 5 chosen characteristics/criteria take place in play, the more the activity can be referred as play (2009, 2013b). Barnett (1998) lists five playfulness qualities that can be reliably measured. (Eberle 2014) who writes from a museum perspective uses five criteria as play standards. The Pedagogy of Play (Mardell et al. 2016) have three over-arching themes which list individual indicators of playful learning. In this thesis,

## Chapter Three Theoretical Framework

a mix of these characteristics and criteria are used as a framework when analysing the behaviours and dispositions of play (Table 3.1).

*Table 3-1 Play Qualities – Characteristics of Play from the Literature*

<b>Play qualities -criteria from literature on characteristics of play</b>		
<b>Play is an activity that is:</b>		<b>Authors:</b>
Voluntary - self-chosen and self-directed		(Barnett 1998, Bruner et al. 1976, Burghardt 2010, Csikszentmihalyi and Hermanson 1995, Eberle 2014, Gray 2009, Gray 2013b, Huizinga 1950, Vygotsky L. S 1933:2016)
Produced in an active, alert, but non-stressed frame of mind		
Free choice - freedom		
Structured by mental rules		
Imaginative		
Spontaneous (cognitive, physical, and social)		
Pleasurable,		
Surprise		
Process flexibility		
Manifest joy, a sense of humour		
Fun (though disputed) , Emotionally Driven		
Non-linear - Means over end - purposeless		
Non-literality - Outside the ordinary		
Intrinsically motivated - Intentional - Flow (Absorption)		
Rewarding, reinforcing, or autotelic (“done for its own sake” Csikszentmihalyi 1996)		
<b>Pedagogy of Play - (Mardell et al. 2016)</b>		
<b>Delight</b>	<b>Wonder</b>	<b>Choice</b>
Includes excitement, joy, satisfaction, inspiration, anticipation, pride, and belonging	Includes curiosity, novelty, surprise, engagement, fascination and challenge	includes a sense of empowerment, autonomy, ownership, spontaneity, and intrinsic motivation

For the purpose of this study the combined indicators from both Resnick (2007a) and Lucas’ (2016) creative learning models are employed in the video coding for DC2 (Fig 3.3).

Chapter Three Theoretical Framework

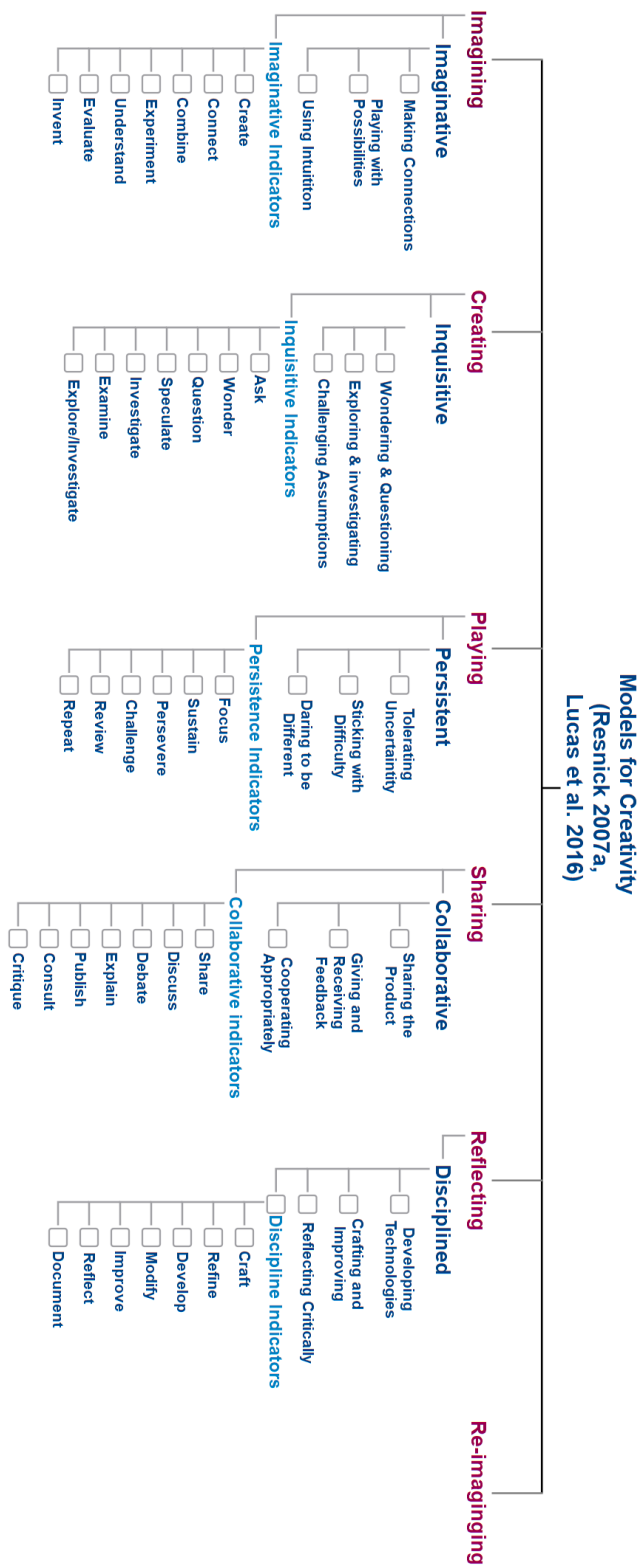


Figure 3-3 Model for Creativity – After Resnick 2007a, Lucas et al 2016

### *3.2.2.3. Engagement, positive affect, and flow*

The principal aim of this research is to engage children with their heritage. To achieve this it is vital the experience is enjoyable and serves as a positive step in a staircase of potential heritage learning experiences. Therefore designing for positive affect is a key concern as emotion and feelings play significant roles in our thoughts, memory making, beliefs, consciousness and meaning making (Dudley 2010). An experience which is connected to our emotions and feelings is one that is embodied and produces deep engagement. This is important for this study as emotional and embodied engagement, and positive affect are beginning to play an important role in understanding in museums and heritage sites (Dudley 2010, Giaccardi and Iversen 2010, Waterton and Watson 2015). A key theorist of this study, Papert, spoke about his emotional engagement with gears when he was a child (1993). Commenting on Papert's passion, or indeed any child's developing interests, Resnick (2020) states 'education has very little to do with explanation, it has to do with engagement, with falling in love with the material' (p. xii). Equally when children physically interact with heritage and place, these embodied encounters are vital for heritage engagement (Petrelli et al. 2013) and facilitating a sense of place. However, no experience can be fully engaging, which O'Brien and Toms (2008) have theorised as part of a four step process of engagement in their research on peoples' experiences with technology. They include four main stages in their framework, the point of initial engagement, period of engagement, disengagement (boredom and frustration), and reengagement. It is accepted there will be periods of boredom and frustration which the design model will address as the model evolves.

In the literature engagement is reflected in three ways, behavioural engagement, emotional (affective) engagement and cognitive engagement (Fredricks et al. 2004) but there is little clarity on what these components entail (Skinner et al. 2008). Similar to the number of characteristics of play, there are many definitions, constructs, and measures of concepts (Wood and Wolf 2008), hence little clarity (Fredricks et al. 2004). Types of engagement can include active participation, hands-on activities, autonomy, sensory, opportunity for choice, self-regulated learning, positive and negative reactions, dwell time, investment (making an effort), interest and values, motivational goals (Csikszentmihalyi 1990, Dudley 2010, Fredricks et al. 2004, Martlew et al. 2011, Newmann 1992, Wood and Wolf 2008). Engagement is perhaps best perceived as a multidimensional construct (Fredricks et al. 2004) which when studied with interactions between individuals and the environment aids the understandings of children's learning in school and in the design of 'specifically targeted and nuanced interventions' (Fredricks et al. 2004).

As this interdisciplinary research draws on a multi-ontological framework, it also draws on multidimensional indicators for engagement. These indicators are used in the DC2 video analysis coding process (Table 3.2.). Many of the indicators transverse into the Pedagogy of Play's playful

learning indicators as outlined in the literature review (Fig. 2.2), showing the relationship between engagement, positive affect and playful learning. Equally in this thesis engagement is evidenced by examples of flow and intrinsic motivation.

Table 3-2 Characteristics of Engagement from the Literature

Engagement characteristics –indicators from literature	
Intrinsic motivation	(Csikszentmihalyi 1990, Csikszentmihalyi 1996, Dewey 1913, Dudley 2010, Fredricks et al. 2004, Furrer and Skinner 2003, Li and Lerner 2013, Martlew et al. 2011, Newmann 1992, Wood and Wolf 2008)
Flow (Absorption) = Concentration, interest and enjoyment Rewarding, reinforcing, or autotelic (“done for its own sake” Csikszentmihalyi 1996)	
Actively Participating- Responding, Focusing, Asking, Leaning in	
Attention, Curiosity , Concentrated attention, Effort, Intentional, Optimism, Passion, Perseverance, Persistence	
Autonomy- student choice that piques interest, manageable challenges, Goal setting, balanced challenge, task control	
Challenge, Positive affect, endurance, aesthetic and sensory appeal Feedback, variety/novelty, interactivity, perceived user control	
Connectedness to peers	

The design interventions in this study will aim for what (Csikszentmihalyi 1990) calls a state of ‘Flow’ where learners are fully absorbed in what they are doing. Being in a state of flow means deep engagement with a subject matter. The study aims to develop opportunities for flow encounters with heritage where the learner is intrinsically motivated to learn. If this happens, learning is taking place, and in the context of a playful learning environment, engagement will be the outcome.

A student is engaged when, in a state of flow, they are concentrating, they are interested and they are enjoying the activity (Csikszentmihalyi 1996). When an individual is in state of flow they are ‘in the zone’, and are fully absorbed in what they are doing. A child’s attention is focussed on an activity, s/he depending on past experiences will focus this attention to specific challenges (Nakamura and Csikszentmihalyi 2002). With a clear set of goals, a not too difficult or too easy challenge, and with an opportunity for immediate feedback, the child becomes completely absorbed in the activity (Nakamura and Csikszentmihalyi 2002). This intense ‘flow’ state is a cognitive-affective state of being, and affords deep engagement and creative expression. Whatever activity flow happen in, even within a ‘narrow field of vision’, flow involves a concurrent sense of control and a feeling of freedom (Csikszentmihalyi 2019, p. xviii). It is important that engaging tasks and activities, providing scaffolding and feedback are part of the toolkit of this research design in order to create flow-like learning conditions. When children have more opportunities for flow-like experiences, it leads to a deeper focus and to optimal learning and engagement.

Positive affect is important to the state of flow. Back in 1990, in his study on optimal experiences Csikszentmihalyi speaks of the ‘phenomenology of enjoyment’ (Csikszentmihalyi 1990, p.

49). His studies suggested eight major characteristics that feed into positive experiences. The following components are core characteristics of a flow experience:

1. **“Goals Are Clear**—One knows at every moment what one wants to do.
2. **Feedback Is Immediate**—One knows at every moment how well one is doing.
3. **Skills Match Challenge**—The opportunities for action in the environment are in balance with the person’s ability to act.
4. **Concentration Is Deep**—Attention is focused on the task at hand.
5. **Problems Are Forgotten**—irrelevant stimuli are excluded from consciousness.
6. **Control Is Possible**—In principle, success is in one’s hands.
7. **Self-Consciousness Disappears**—One has a sense of transcending the limits of one’s ego.
8. **The Sense of Time is Altered**—Usually it seems to pass much faster.
9. **The Experience Becomes Autotelic**—It is worth having for its own sake “

(Csikszentmihalyi 2014d, p. 133)

In these conditions, the learner knows what they want to do, they are intrinsically motivated, focused, concentrating, in control of their actions; children are lost in their own learning, time and self are temporarily forgotten, and the activity is worth doing in itself. These attributes of flow are important for this research design which aims for engagement with heritage. However, it may not always be possible to achieve a state of flow with constraints and different learning contexts. In that situation, (Nakamura and Csikszentmihalyi 2002) recommends educators to lead the child to a flow-like experience, by identifying activities that the child enjoys, and by learning how to direct the child’s attention to these activities.

#### 3.2.2.4. *Digital augmentation*

A key aspect of the *TEChE* design model is the integration of technology into cultural heritage interactions, both in the formal school classroom where the curriculum is the focus, and in the non-formal/informal learning practices of the museum. Throughout the interventions, the focus is on the digital to augment well-guided, creative heritage learning experiences that immerse and engage the child in the classroom and in the museum.

- There can be a steep learning curve in technology, not just for the children but also for the teachers and educators. For that reason the technology used should be simple and low threshold (Gilbert 2002) as it cannot be assumed every child is digitally competent or has access to technology at home.

Additionally, technical help and guidance should be scaffolded. In this study, some children are already playing simple video games like Minecraft in their homes and using apps such as iMovie, ComicLife, WeVideo, Animoto. These apps were chosen for this study because they are easy to learn and, for some children, hold a degree of familiarity.

- Technology can enhance pedagogy and develop interest in subject matter. Mobile technologies such as iPads afford the many types of constructivist learning e.g. active, discovery-based and self-directed, experiential, inquiry-based, and situated learning. As children create rather than consume, technology can mediate existing heritage learning experiences and result in new possibilities for effective learning. It is hoped the addition of technology to this study will afford awakenings, understandings and awareness of local heritage and place and develop curiosity and interest in children. The digital mediation of the local will support the co-creation of shared heritage meanings and values. The combination of technology and playful learning (learningful play) is transformative for perspective on heritage and place, new media having transformative possibilities. Children with the support of technology can interpret and re-represent sites/objects that have personal meaning to them, they can communicate and share their digital artefacts with peers and public, and by doing so, they are building knowledge and deepening their heritage/place learning and engagement.

- Technology can support motivation in children, when a subject is tied to novel digital interactions in the classroom (e.g. Minecraft), children are motivated to engage with heritage. The technology can support knowledge production and give additional meaning. Intrinsic motivation is very important for learning and technology and can be the spark to fully participate in the learning experience. In this study technology enhances learning and engagement through a storytelling process. As children make sense of their physical interactions with heritage and with their previous understandings, digital supports and augments this learning process. Creating knowledge through narrative, the process aims to motivate and, engage the children. As they create a digital story, no matter what the quality of the final artefact, the positive educational impact is in the process.

- Social interaction is vital for learning. Whereas technology is not a substitute for personal interactions, it can augment existing social interaction (Papert 1993) and provide opportunities for participatory learning and new collaborations while interacting with the local. It is hoped children will be able to choose their collaborators in the following interventions as this is closely linked to the overall enjoyment of the heritage learning experience.



- Although the focus of this thesis is heritage engagement digital augmentation will increase the skills and literacies of the children. Skills such as problem-solving, creative learning processes (adaptability, re-assessing goals, re-imagining new possibilities) will be enhanced. Additionally the use of technology adds positively to traditional literacies as well as to multi-modal literacies, digital literacies, heritage literacies and contributes to the production of culture and children's cultural capital.

- If the technology is 'done right' during the design process, the technology can afford children the opportunities for experimentation, exploration and expression and through this process develop as creative thinkers (Resnick 2017) and gain understanding of the creative process (Resnick 2020). Technology is also a pen and paper, anything new that has been invented is a form of technology. In this regard the creative arts, drawing, painting, craft making all are technological forms of engaging with heritage, aligning to Papert's beliefs that constructing sketches in a sketchbook and enhancing creative expression are of equal value to constructing with computer technologies (1993).

Constructionism is both a 'theory of learning and a strategy for education' (Kafai and Resnick 1996). Constructionism is based on constructivism, where learners create new understandings and ideas related to existing ideas and understandings in their minds. Constructionist learning adds understanding takes place when children are 'consciously engaged' in the purposeful goal of making an artefact (Papert and Harel 1991). By exploring a topic and making a meaningful artefact children learn (Papert and Harel 1991). As children construct things, they are constructing new ideas and theories in their minds, which in turn motivates them to further construct new things (Resnick 2020).

Papert recognised the value of technologies to children's creative expression, and saw rich learning opportunities in many different types of 'construction' activities ranging from building sandcastles to drawing images in a sketch book (Resnick 2020). Constructionism is often thought of as just 'learning by making', but has many different styles of learning within the theoretical framework (Papert and Harel 1991) including the 'art of learning', or 'learning to learn' (Ackermann 2001, p. 438). Through making artefacts and sharing those with others, self-directed learning and construction of new knowledge is the result (Ackermann 2001). Minecraft, the sandbox digital game, used in this thesis as a choice activity, is an example of constructionist learning (Christiansen, 2014). Papert's theories and outlook on education influence the activities and strategies of this thesis. He advocated for computers to help children think and learn (1991) and he wanted to develop children's thinking and develop their voice (Resnick 2020). He saw the computer as important as writing, it was a means

of expression in that children could organise and express their ideas and become active participants in society (Resnick 2020).

### 3.2.2.5. *Sociality*

Social constructivism provides the theoretical context for many type of learning experiences that children require to develop and grow. The nature of ideas from this theoretical realm include participation, culture, relationships, agency, meaning, identity (Hall et al. 2014), as well as conversation, interaction and affective engagement with others (Moyles 2015).

Children learn from others, either with support from adults or from their peers. This is central to Vygotsky's theory of the zone of proximal development (ZPD) outlined earlier in this chapter. When children are scaffolded, when tasks are supported by adults or peers, the processes between the child and the adult or peer ("intermental") become internalised and become 'intramental' processes (Vygotsky 1930:1978). This is the ZPD for the child and where their learning takes place. The ZPD is naturally facilitated easier in 'free-choice' (Falk and Dierking 2000) museum settings where many learning programmes have social interaction and sociocultural theory embedded (Wong and Piscitelli 2018). However, it is aimed through this design study to increase the opportunities for ZPD in the formal school classroom as it is important children interact of their own free will with peers and in doing so learn from each other. Papert believed peer-based learning was at the core of a learning society (Resnick 2020, p. xiii). It is important to this design that the role of the facilitator is not to teach but to support the child reach their developmental potential. The social constructivist lens in this study places emphasis on the dialogic negotiation of heritage understandings. As social constructivist knowledge and understandings are dependent on social interaction, the role of dialogue in co-constructing knowledge is important for this study in the making sense of heritage and place.

## 3.3 Chapter Summary

This chapter outlined five high level lenses for the *TEChE* heritage engagement framework that will guide the design cycles: materiality, digital augmentation, engagement, sociality, play-based learning. The theories that inform this research' multi-ontological framework are outlined. These theories include constructivism, constructionism, social-constructivism, play, creative learning, engagement and flow. In the following chapter the methodology and the rationale for its selection is outlined. The choice of methodology follows from the thesis' research questions, the literature review and the conceptual framework.

## Chapter 4 Methodology

This section outlines the rationale for choosing a methodology to answer the primary research question set out in this thesis, namely, how can we optimally design for children's engagement with cultural heritage using constructionist technologies in formal and informal learning environments? The origins and development of DBR as an educational research paradigm are explained. Challenges in the methodology are noted and considered within this research. Additionally, data collection and analysis methods are included in this chapter as well as the ethical approaches taken within this research.

### 4.1 Characterising the problem

This study addresses a primary research question and two supporting questions. The primary research question is: How can we optimally design for children's engagement with cultural heritage using technologies across formal and informal learning environments? The supporting questions help answer the main question: (a) what is the potential of play-based approaches to enhance heritage and place engagement across informal and formal learning environments? and (b) what are the core design features of a creative learning model for heritage engagement? The overall aim of the study is to foster children's engagement with local heritage and place using technologies across the formal school environment and the non-formal setting of the museum. I wish to advance the potential of *TEChE* as a **Technology-Enhanced Cultural Heritage Education** model for heritage learning and engagement through working with young people in the naturalistic settings of classrooms and in museums. Additionally, the evolving model will forefront children's reflections on learning and engagement, and feed back into this iterative educational design process.

### 4.2 Philosophical stance

At the outset of my research I needed to ascertain which methods would be best suited to answer my research questions. As the researcher's theoretical lens plays an important role in the selection of methods and the researcher's belief system defines the choice of method (Krauss 2005) I needed to explore my paradigm and develop awareness of my core assumptions that may underlie my work and inform my choice of literature, methodologies, methods and research questions (Grix 2004). A paradigm is composed of one's ontology and epistemology. Ontology involves the philosophy of reality and epistemology is how we come to know that reality (Krauss 2005). Both form the

foundations upon which research is built (Grix 2004) and together with methodology beliefs they shape how I as a qualitative researcher see and act in the world (Denzin and Lincoln 2005). Therefore it was important to explore my worldviews and beliefs and to clarify how I construct reality and knowledge, my positionality and my educational philosophy (Krauss 2005). My professional background and my lived experiences have had an impact on the whole study. As a person with artistic and creative sensibilities I naturally fall into the interpretivist educational paradigm. However, it was necessary to explore all three main educational paradigms; positivism, interpretivism and critical realism to ensure full understanding of educational philosophy.

In the positivist paradigm the object of study is separate from the researcher, knowledge is gained and verified through measurements and direct observations of phenomena (Krauss 2005). Facts are gained from taking apart a phenomenon and examining its components (Krauss). The positivist/scientific paradigm has been criticised for research on human affairs (Gage 1989), Grix (2004), (Mack 2010). Human affairs includes learning and teaching which are linked with purpose, goals and intentions that give them meaning (Gage 1989). In educational research human affairs matter, therefore Brown and Collins (1999) began developing educational design experiments in the 1990s which led to what is generally known today as DBR methodology. For this thesis I believed the context of a learning and teaching classroom with all its variables would not lend itself to a positivist enquiry and to an absolute truth (Mack 2010). Therefore, positivism would not work for exploring engagement as humans and their interactions cannot be measured by an objective reality.

Interpretivism, sometimes referred to as constructivism (Mack 2010) rejected positivism and regarded individuals as being able to construct their own social reality rather than reality being the determiner of the individual's perceptions (Gage 1989). Researchers in this paradigm look to understand, rather than explain as in positivism (Mack 2010). The interpretivist paradigm is concerned with meanings and interpretations, it is concerned with interpreting and understanding the world in "terms of its actors" (Cohen et al. 2011, p. 31). It is subjective and allows for multiple perspectives, multiple interpretations and direct experiences of people rather than them being viewed objectively from the outside (Mack 2010). Subjective understandings and making meaning are considered important in this research for engagement. However, one of the limitations of interpretivism is that results cannot be scientifically verified, therefore results cannot be generalised to other contexts (Mack 2010). However, within DBR methodology carried out in this thesis, generalisability is a core aim.

A third paradigm exists called the critical paradigm. If positivism is to explain social phenomena, interpretivism is to understand social phenomena, the critical paradigm changes and

challenges social phenomena (Mack 2010). Critical theory is concerned with social justice and equality (Cohen et al. 2011). Additionally, it emphasises the importance of power in society and how schools define social reality, how education serves the dominant social class (white, male, not inclusive of poor, non-whites and females) and maintains the status quo (Gage 1989). Whereas the research was carried out in the interpretivist paradigm I also developed awareness of the critical and transformative paradigms, mainly surrounding feminism, post modernism, critical pedagogy, power relations as in Foucault structuralism and participatory research approaches, involving children as equals.

I believe knowledge is constructed and therefore justify my interpretivist, constructivist positionality. However, I struggled with my ontological view when it came to delving deeper in to understanding heritage. There is a long standing debate in heritage discourse between essentialism (reality, materiality) and constructivism (meanings and understandings). School curriculums and archaeological narrative in general has been more towards the essentialist understandings of heritage which is important but not wholly. Making meanings and constructing understandings are also important. Therefore I see the heritage debate as a continuum, with a critical realism in the centre and place myself centrally, leaning towards the constructivist end but also aware of the materiality and its importance. This was discussed earlier in the Literature Review. As an educational researcher I see my future role as affecting change in education, addressing inequalities and questioning dominant social and political narratives, not only in the heritage domain but in all educational interactions involving youth.

### 4.3 Methodology Requirements

The methodology chosen for this research would have to answer all aspects of the research questions. The methodology should be suitable for front line educational practice, in the 'messy' context of a classroom and the public space of a museum, each having their own variables, dependencies and contexts. The methodology chosen needed to align practice and theory closely, to be flexible, and transferable from formal to informal (and vice-versa) educational settings. In judging the type of methodology required perspectives from the literature review and previous similar research projects needed to be considered. The chosen research methodology should facilitate the production of a set of design sensitivities to enhance children's engagement with heritage in schools and museums and develop evidence-based claims on heritage learning and engagement. Following these claims tools could be developed, curriculum and especially theory could be developed to understand and support learning (Barab and Squire 2004).

### 4.3.1 Methodological approach

According to (Braun and Clarke 2013) the research questions should dictate the methodology, therefore I undertook an analysis of the literature to explore potential methodologies and similar research questions in classroom and museum contexts. From the literature I deemed I hold, what Braun and Clarke (2013) call a 'qualitative sensibility', an orientation towards research that includes an interest in process and meaning, a critical and questioning approach to knowledge and life, an ability to step outside one's own assumptions and biases, an analytic ear or eye and understanding and practicing reflexive practices.

### 4.3.2 Qualitative approach rationale

Based on the literature search and on my interpretivist, transformative and growing critical realist stance, a qualitative approach was deemed appropriate for this research. A quantitative approach would not capture the nuances and social interactions, or the complexity of human learning and engagement. Although both quantitative and qualitative approaches are of value, quantitative researchers activities are more sequential than cyclical or iterative (Miles et al. 2014), more often emphasise measurement and analysis of causal relationships between variables (Denzin and Lincoln 2005), are devoid of context (Miles et al. 2014), value-free (Denzin and Lincoln) and linked to a positivist scientific paradigm. On the other hand qualitative researchers emphasis is on processes, qualities of entities and meanings that are not experimentally measured or examined in terms of frequency, intensity, amount or quantity (Denzin and Lincoln 2005). Qualitative research is value-laden, process centered, and comes from a more fluid and human-centered position, one more interested in the how social experience is created and meaning constructed (Denzin and Lincoln 2005). The meaning making process, important to this thesis is facilitated by qualitative research. The meanings made by children are significant for learning, and in turn learning can challenge pre-existing meanings, allowing confirmation of worldviews or creation of new meanings (Krauss 2005). Qualitative research does not have a separate, clearly defined set of practices or methods that are fully its own (Denzin and Lincoln 2005). Qualitative researchers can use graphs, statistics, numbers and tables and I explored statistical differences in the data when analysing children's data, detailed in later chapters.

### 4.3.3 Qualitative approach and methodological paradigm

Once establishing the study would take a qualitative approach, it was necessary to select a methodological paradigm. Careful consideration was taken of action research, case studies and DBR, all suitable paradigms for educational research.

Case studies focus on just one instance of what is being investigated (Denscombe 2010), and studies the instance in detail and depth. The 'case' that forms the basis of the inquiry exists prior to research and continues to exist after the completion of the research (Denscombe 2010). Cases are selected on known attributes. Although case studies can be discovery and theory led they are not iterative in nature (Denscombe 2010). As the primary research question in this study was a 'how to design' question, the iterative approach of DBR held an advantage over choosing case studies.

Action research solves a practical problem and produces guidelines for best practice and is useful for professionals who want to study their own practice (Denscombe 2010). Whereas action research is cyclical similar to DBR, findings from action research relate to one instance (of the practitioner) and are not generalisable. DBR was chosen as the most relevant paradigm for the research questions of this study. The rationale for choosing DBR is discussed in the next section.

## 4.4 Design-Based Research (DBR)

### 4.4.1 Origins

In 1992, Ann Brown and Alan Collins published papers on educational design research which were seen as "primary catalysts for launching the genre of educational research" (McKenney and Reeves 2012, p. 11). Brown and Collins believed laboratory studies with conventional approaches to educational research could not replicate a real natural classroom with all its variables, contexts and messiness (Walker 2006). They believed if examining learning and cognition processes are only carried out in a laboratory (away from the naturalistic setting) then understandings would be incomplete (Barab and Squire 2004). Neither could theories emanating from positivist paradigms of laboratory settings fully produce evidence-based and empirical theory relevant to a natural real-world classroom. Observing learning and cognition processes in naturalistic settings required a new methodological toolkit (Barab and Squire 2004). Brown and Collins began by conducting 'design' experiments' in natural learning settings. These design experiments addressed the complexity that "is the hallmark of educational settings" (Cobb et al. 2003, p. 9) and characterised messy learning situations including many factors that influence learning e.g. classroom materials, learner activities, teacher expertise (Wang and Hannafin 2005). Within these authentic learning settings theory

informed design and design informed theory (McKenney and Reeves 2012). Brown & Collins' design experiments led to the methodology known as Design-based research (DBR) which has grown 'in popularity and significance' since 1992 (Barab and Squire 2004).

### 4.4.2 What Is DBR?

DBR can be defined as a

*"collection of approaches that involve a commitment to researching activity in naturalistic settings, many of which are designed and systematically changed by the researcher, with the goal of advancing theory and at the same time directly impacting practice"*

(Barab 2006)

DBR as a paradigm advances design, research and practice (McKenney and Reeves 2013, Wang and Hannafin 2005). A key aim of DBR is to synergise the study of teaching and learning at the point where research methods and design meets (Kelly et al. 2008) with DBR's value being measured by its improvements in educational practice (The Design-Based Research Collective 2003, p. 8). There had been criticism of education's weak link with practice (McKenney and Reeves 2012, The Design-Based Research Collective 2003, Van den Akker et al. 2006) which created a need for a new research approach to deal specifically with practice. Within the paradigm of DBR there are various terms used in the literature which include design research, formative research design experiments, research design, educational design (Reinking and Bradley 2008); all address complex problems in educational practices where there are 'no how-to guidelines' (Plomp and Nieveen 2013) or 'definitive guide' (McKenney and Reeves 2012, p. 1).



#### 4.4.3 Characteristics

The Design-Based Research Collective (2003) propose good DBR is characterised by the following:

1. “First, the central goals of designing learning environments and developing theories or “prototheories” of learning are intertwined.
2. Second, development and research take place through continuous cycles of design, enactment, analysis, and redesign (Cobb, 2001; Collins, 1992).
3. Third, research on designs must lead to shareable theories that help communicate relevant implications to practitioners and other educational designers (cf. Brophy, 2002).
4. Fourth, research must account for how designs function in authentic settings. It must not only document success or failure but also focus on interactions that refine our understanding of the learning issues involved.
5. Fifth, the development of such accounts relies on methods that can document and connect processes of enactment to outcomes of interest.”

(The Design-Based Research Collective 2003, p. 5)

Design research is a complex and multi-faceted undertaking (McKenney and Reeves 2012) but can be a ‘coherent methodology’ (The Design-Based Research Collective 2003) to bridge educational practice and theoretical research. To generate theoretical understanding, interventions are developed to address a problem in practice and are empirically investigated (McKenney and Reeves 2013) which can provides strong explanations of innovative practice (The Design-Based Research Collective 2003). There is a focus on design, testing and refinement within an intervention. There can be multiple iterations. DBR is process and utility oriented and yields design sensitivities that can be adapted (localised) and adopted by others (Anderson and Shattuck 2012, Cobb et al. 2003, Crippen and Brown 2018, McKenney and Reeves 2012, Van den Akker et al. 2006, Wang and Hannafin 2005). Design Research is becoming increasingly used in educational studies (Anderson and Shattuck 2012, Van den Akker et al. 2006) with K-12 contexts in the United States and technological interventions counting for an increasing amount of DBR studies (Anderson and Shattuck 2012). DBR has brought a ‘new wave of optimism concerning the relevance of educational research’ (McKenney and Reeves 2013) and holds great promise for theoretical contributions and the public value of educational technology research (Van den Akker et al. 2006).

Design Experiments are carried out to develop theories not to explore what works (Cobb et al. 2003). These theories that are developed are 'relatively humble' in that they target learning processes of specific domains (Cobb et al. 2003). The understandings and explanations within the theories are vital for educational improvement. Theories can be transformed into effective learning within other practical educational contexts (The Design-Based Research Collective 2003) and in sharing can help communicate relevant conclusions to other educational practitioners and designers. McKenney and Reeves (2012) note the need for increased understandings that are reliable and prescriptive to guide vigorous design of educational processes, programs, products and policies.

Most design interventions in the classroom are to support students learning in a particular content domain (Cobb et al. 2003). The theoretical intent is to find and explain successive patterns in student thinking and relate these patterns to how they were developed and supported (Cobb et al. 2003). Interventions are enacted through interactions between learners, materials, and teachers (The Design Collective 2003). The intervention is both a descriptive theory-generating stage and a prescriptive, solution-generalization stage with multi ontological frameworks guiding the complexity of the problem (Crippen and Brown 2018). There are normally two to six cycles within DBR , although in a DBR literature review Zheng (2015) found many DBR studies only conducted one cycle of iteration. A study by Thompson Long and Hall (2015) developed a working framework from a three cycle intervention; a pilot, mainstream and capstone. This study has three design cycles covering seven interventions.

#### 4.4.4 DBR in a Museum Setting

There has been notable use of DBR as a methodology in the formal educational setting of schools since the 1990s. In 2006 design-based approaches were confined to formal education environments and computer-based learning environments (Hauser et al. 2009). Hall (2004) found a dearth of systematic design research in computer technology for children in museums. Likewise, Reisman (2008) found little literature on DBR for non-formal learning environments in her study on learning and social interaction in a science center. Schauble et al. (1997) point to the changing learning research in museums. To the authors it is problematic when theory and practice are not brought together to address practical problems as they found in their research. Theories need to be elaborated and expanded (Schauble et al. 1997), they need do more work (Cobb et al. 2003). By doing more work "formulations that are elegant but unfounded will be weeded out" (Schauble et al. 1997, p. 7).

In a DBR museum study by Hauser et al. (2009), the authors proposed DBR as a solution to integrating research, evaluation and development into museums. Their DBR advanced theory, translated research into practice, increased understanding of the learning processes, and

incorporated insights into improving and developing exhibitions. Reisman (2008) argues for DBR as an approach within the museum community so museum educators can learn from each other, avoid duplicating evaluation work and research, and improve museum learning environments. Additionally, Hall (2004) advocates for DBR as a useful methodology to make museum learning environments work. By drawing theories from the intervention and sharing with the community, design sensitivities accumulate for improvement of learning outcomes within communities (Hall 2004).

### 4.4.5 Rationale for a DBR approach

There were several features and aspects of DBR that led me to employing DBR as a research methodology. The overall flexibility within DBR afforded me as a beginning researcher to understand relationships between educational theory, practice and the designed artefact while progressing through design iterations. Additionally, DBR would help understand how educational innovations work in practice as well as when and why they work (The Design-Based Research Collective 2003). Within the context of education being 'messy' and contextual, the exploratory nature of the research design in trying to foster engagement and learning within different complex educational settings, all were factors in why I chose DBR as a methodology. The cycles of design, enactment and analysis provided an ideal framework for the research questions in this research. "DBR methods respond to emergent features of the setting" (The Design-Based Research Collective 2003), therefore going from one educational context to the next allowed for improvement of design activities, enacting new developments, and the analysing of learning and engagement interactions. This cyclical and iterative nature drove the development of following interventions and the development of theory as well aiming towards what The Design Collective (2003) call meaningful change in contexts of practice.

DBR takes design into account, which is important for this research. The Design Collective (2003) point out to the centrality of design in DBR. The cyclical nature of DBR, its flexibility and adaptability is important in the ongoing design process and achieving a robust design. Knowing that I could iterate as I went through the design cycle process allowed me to experiment and take risks, important for any type of creative innovation. DBR helps develop usable knowledge about, and the reform of teaching and learning, which is important for any innovation in education (The Design-Based Research Collective 2003). Therefore this methodology fitted the need to explore heritage education in its current form in schools and museums. DBR allowed for the formation of a working design model, one that could be tried and tested in the formal classroom and the informal learning environment of a museum. This resulting model is a goal rather than artefacts or programmes (The Design Research Collective 2003). DBR as a methodology could highlight the potential of a heritage educational

innovation, reach deeper understandings of the learning and engagement processes, how these processes related to the outcomes and the possible impact of those innovations.

### 4.4.6 Challenges and limitations of DBR

A credibility gap exists in educational research (The Design-Based Research Collective 2003). The Design Collective point to this gap originating as coming from unscientific approaches and the separation of research from practice. As a research methodology there are criticisms of the DBR approach concerning rigor, reliability, validity, and generalisability. Dede (2004) has expressed a 'queasiness 'about DBR's research methods including its "uncontrolled variables, morphing interventions, and changing research strategies" (p. 108).

To counteract these criticisms there are certain ways design-based researchers can address DBR challenges. One criticism has been directed towards the subjectivist stance of the researcher. Maintaining an objective stance can be blurred (Hoadley 2004) and there is inevitably researcher bias (Kelly 2004). Researchers need to be self-reflective, understand their own biases, question their own assumptions and be aware of their subjectiveness to enable understandings that are generalisable across all various context (Hoadley 2004). If credibility is showing the care you took in carrying out the research then transparency and allowing the reader determine the researcher's biases, processes, sensitivities and thoroughness of the design will ensure credibility (Rubin and Rubin 2012). Avoiding bias is a type of rigor which can be achieved by replicable experiments and detailed descriptions of methods although this is difficult in the classroom with all its complexities and contextual differences (Hoadley 2004).

There are challenges around interventions in messy, complex settings. Building on iterative understandings of theory is difficult (The Design Collective 2003). In DBR validity, reliability and objectivity are different from the scientific approach of controlled experiments (The Design-Based Research Collective 2003). DBR has to deal with these issues of validity, reliability and objectivity which involves the use of thick descriptive datasets, systemic analysis of data, and consensus building when interpreting data (The Design-Based Research Collective 2003). Validity is addressed by the iterative nature of DBR which results in increasing adjustment of design, theory, measurement and practice (The Design-Based Research Collective 2003). Additionally validity can be addressed by drawing connections to theory that transcend the local context (Barab and Squire 2004). If the interpretation of our results likely reflect the hypotheses under examination and the truth of the theory then the study is valid (Hoadley, 2004). However (McKenney and Reeves 2012) state that the external validity of a particular study is the ability of that study to be generalized which stands to be increased when carried out in natural settings and contexts.

Generalising understandings, final models and/or prototypes from all various contexts is difficult and to claim success is 'tricky' (The Design-Based Research Collective 2003).

Although models or prototypes establish the potential of the DBR approach and how it might be used to enhance learning and education and facilitate innovative practice, models are never complete or finalised. Whereas they can be refined and improved, there are many factors which cannot be followed or replicated in another learning environment (The Design-Based Research Collective 2003). Therefore triangulation through multiple data sources is importance for reliability as is repetition of analyses over cycles and similarly standardised instruments or measures (The Design-Based Research Collective 2003). Triangulation is defined as using two or more data collection methods in research on some aspect of human behaviour and is a way of showing validity in a study as it explains a human behaviour from more than one perspective (Cohen et al. 2011). Using triangulation, or multiple methods, shows an attempt to reach deep understandings of the phenomenon in question (Denzin 2012) and extends the knowledge we seek in our research (Flick 2007). Triangulation itself brings challenges. (Denzin 2012) states that objective reality cannot be acquired and that triangulation is the concurrent display of multiple realities. Kelly (2004) asks who decides what to analyse, what about "miles of videotape left unwatched and student "artifacts" unread?" (p. 124). Fleshing out the processes and outcomes to ensure validity and reliability through rich thick descriptions are important in DBR, Barab and Squire (2004) point to narrative as one way of making sense of DBR as the design unfolds. By laying open and problematising the finished design and its implementation, providing rich descriptions of contexts, design features and their impact on learning and teaching and details of emerging theory insights into the local dynamics can be achieved (Barab and Squire 2004). Therefore to achieve validity, rigour and reliability this thesis takes the above concerns into account and actively incorporates researcher bias awareness, drawing connections to theory, replicating experimentation, triangulating the data, detailed and rich descriptions of problems, processes and contexts, within the practice of this research.

### 4.5 Research Methods

#### 4.5.1 Qualitative approach and creative research methods

Creative methodologies are rising (Rabbiosi and Vanolo 2017) and becoming popular in the qualitative paradigm. Creative research methods are an alternative to language-based methods such as interviews and focus groups (Gauntlett 2007) and deliver fresh creative, exciting, evocative ways and approaches to qualitative research (Miles et al. 2014). As a term creative research methods is very

fluid (Kara 2015) and covers inquiries such as arts based, visual, poetry, storytelling. Analysing the data in a creative way allows for new ways of understanding and knowing (Flewitt et al. 2015) and can generate findings and insights that may not be discovered in more traditional research approaches (Brearley 2000, Owton 2017). The more methodological tools available to a researcher broadens their understandings and increases the likelihood of answering research questions especially in social science disciplines (Kara 2015).

### *4.5.1.1. Poetic inquiry*

As part of my overall data analyses I explored poetic inquiry following the form of Richardson (1992) and Poindexter (1998) who in their use of data to compose verse use only the exact words of the participants. Richardson (1992) claims that by playing with literary devices and connotative structures poetic representation conveys meanings and opens up interpretations in a way prose cannot (1992 p.126). With poetry we can see things differently (Broussine 2008) and it can have a different effect on a reader rather than prose albeit both contain the same words (Kara 2015). Experimental writing based on research is growing (Olesen 2005) and is especially common-place in first-person ethnographic texts (Denzin and Lincoln 2008). Many researchers are challenging the “voice of the omniscient academic observer” (Brearley 2000, p. 4) and exploring creative forms of representation that reflect complexities and richness of the data, and affording many levels of emotional and cognitive engagement. Additionally, many researchers are disseminating data findings in poetic form (Commeyras and Montsi (2000), Owton (2017), Prendergast (2007), Prendergast (2009). Research has shown how poetic inquiry can reveal something of the essence of peoples experiences (Owton 2017) and as a reflective tool to make sense of experiences, giving a deeper insight into the emotional side of social interaction (Broussine 2008). The ability of poetic inquiry to reveal and communicate multiple truths (Owton 2017) appealed to me as a reflective tool to aid sense-making of children’s data and experiences. Poetry can be used to support data analysis (Kara 2015) and there is “plenty of scope for creativity in data analysis” (p. 119) whilst making sure findings are rooted in the data (Kara 2015). Within data analysis a poem can be both a research finding and analysis (Brearley 2000), research does not lose its rigor by finding expressive forms and different voices to convey important meanings and experiences (Fineman 2000).

Sampson (2009) writes that a well-made poem is a completed object, a “whole to which every part contributes” (2009, p. 10). While making sense of the children’s reflections and being conscious of the data in poetic form forming a ‘whole’ I asked myself is my arrangement of the data into poetic form composed of a “completely achieved insight, moment or thought” (Sampson, p.10) and are these arrangements as close to an objective reality of the intervention or just a manipulation of data tying

in with my own worldview. As Mason (2018) points out self-questioning is a reflexive act, thinking of what I am doing and why, confronting and challenging my own biases and assumptions and recognising how my own assumptions and biases influence my research (2018, p. xi). Many writers think they can be creative without attention, practice, and training Cresswell (2013). Richardson and Adams St. Pierre (2005) advise joining poetry groups to encourage creative analytical writing practices. From my experience in a poetry group, I am aware of the subjectiveness when writing poetry.

A thorough literature review of the field ensured best practice and evoked within the poetry a sense of the context, the experience and the atmosphere objectively. In the literature on poetry as a creative research method there are over forty terms to describe poetry; such as poetic narrative, field poetry, found poems (Prendergast 2009 cited by Kara 2015). Free verse is the most common form of poetic representation (Kara 2015) which was the main form I experimented with, alongside Haiku, Tanka and Cinquain forms. It is important when using poetry as a research method the participants' voices come through, and that their views, meanings and experiences are well represented and useful to findings and discussion.

### *4.5.1.2. Visual methods approach*

There has been an increased interest globally in visual research methods (Prosser and Loxley 2008). Many qualitative researchers had little interest in visual methodologies or visual enquiry but in recent years they have developed "a 'burgeoning interest'" in all forms of the visual - communication, practices and culture (Emmison 2004, p. 248). As sociologists, Knowles and Sweetman (2004) understand visual methods as the use of visual materials being an integral part of the research process itself. Within this thesis visual methods is taken to mean the use of images, drawings, art, children's own photographs and videos, as well as researcher's videos and images as a visual practice and important forms of research data. Video is outlined as a research method in Design Chapter Two. Additionally within DC2, children were given iPads and small handheld video cameras to record their experiences on field trips. The purpose was to afford children the opportunity to communicate what was important to them, which potentially may have been overlooked by me as the facilitator of the field trips and workshops.

Children created drawings as part of their creative and reflection processes in the first two design cycles. In DC3, the focus was wholly on the creative arts as a means of engaging with place. For all participants drawing is a form of artistic expression; it allows young people express visually what they might not be able to articulate verbally (Diem-Wille 2001). Vygotsky has described drawing as a type of 'graphic speech' (Ring 2001). It is an alternative to writing and provides a means to slow down observation encouraging deeper reflection on all things visual (Prosser and Loxley 2008). Children can

## Chapter Four Methodology

reveal their imaginative and meditational processes in their cultural and social worlds through their drawings (Diem-Wille 2001, Wood and Hall 2011); therefore they are a way to gain insights and understand the complexity of children’s sociocultural interpretations and meanings (Prosser and Loxley 2008) and enhance understandings of children’s engagement with those worlds.

Children’s drawings were interpreted and coded in this research. Care was taken with interpretation and similar to what Diem-Wille (2001) found, context is important. Additionally, there were ethical concerns to be considered which involved thoroughness and self-questioning in order to understand children’s meanings from their drawings. An adaption of a methodological tool to analyse and code children’s drawings (Xu et al. 2009) proved useful in coding children’s drawings for this research (Appendix B).

### 4.6 Data Collection

Table 4.1 gives an overview of participants, the interventions, design cycles, as well as the instruments used to answer the research questions.

*Table 4-1 Data Collection Overview*

Overview of Design Cycles				
Phase	No. of Children & School Museum ID	Instruments	Dates	Ages
Planning Phase	1 Teacher	<ul style="list-style-type: none"> <li>Semi-Structured Interview</li> </ul>	January 2016	
DC1	22 – School (S1.1) 14 – Museum (M1.2)	<ul style="list-style-type: none"> <li>Children’s weekly reflections (school)</li> <li>Children’s daily reflections (museum)</li> <li>Pre and post questionnaire</li> <li>Fun Toolkit (Read 2008, Read and Mac Farlane 2006)</li> <li>Group interview post-project (school)</li> <li>Researchers reflections</li> </ul>	January to April 2016	10-13
Teams: Museum: two teams of four and two teams of three – self-selected School: Teams of 4 and Teams of 5				
DC2	75 Children School (3 Schools, S2.3,S2.4,S2.5)  12 Museum (M2.6)	<ul style="list-style-type: none"> <li>Children’s daily reflections</li> <li>Children’s reflection journals</li> <li>Pre and post questionnaire</li> <li>Parental survey (museum)</li> <li>Fun Toolkit (Read 2008, Read and Mac Farlane 2006)</li> <li>Researchers reflections</li> <li>Children’s drawings</li> <li>Video and audio recordings by and of children</li> </ul>	May - July 2017	10-13
DC3	8 – Museum (M3.7)	<ul style="list-style-type: none"> <li>Weekly questionnaire (3-4 open ended questions)</li> <li>Researcher reflections</li> <li>Audio recordings</li> <li>Students artefacts</li> <li>Videos by teenagers</li> <li>Post-project online survey</li> </ul>	February – April 2019	15-18



### 4.6.1 Sampling

The principal study is based on a purposive sample of participants and involves voluntary participation of 5<sup>th</sup> and 6<sup>th</sup> class pupils (aged between 10-13 years) from voluntary participating schools. Voluntary participation of youth (advertised publicly) form the museum cohort of participants. Overall, class sizes average 24 participants and museum workshops (all design cycles) sizes average 11 participants (Table 4.1).

### 4.6.2 Reflexivity and researcher reflections

Reflection, according to Moon (2004) is somewhere between thinking and learning. We reflect to learn something and we learn as we reflect. Reflective writing was an important part of this research. As a researcher I was aware self-awareness was needed throughout the research to continuously question my assumptions, my biases and interpretations. Qualitative research is not neutral. Researchers bring their subjective selves to the research, they themselves are research instruments and their background can actually shapes the direction of the research (Cohen et al. 2011, Creswell 2003). Moon (2004) gives examples of what good reflective writing entails; questioning and answering those questions, looking at others viewpoints, internal dialogue, recognising prior experiences and how our emotional state might affect our thinking at the time, standing back from the event and seeing as an observer, the effect of time passing and how new information later can change one's perspective. Moon (2004) advises understanding your emotional state and the influences that are shaping your writing as you write or the different mediums of reflection including drawing. She adds one will also learn from the process of representing the reflection itself. On a personal level reflecting my own research experiences and processes through writing and art was something I carried out during this research (Appendix C).

### 4.6.3 Children's' daily reflections

Blank sheets were given to children at the end of each day. I asked each child to share their thoughts on their day. The sheets were purposely left blank, with no written questions or statements so as not to lead the child. Towards the end of DC1 I did include a question on the reflection sheet as I was not getting deep reflections from the blank page.

### 4.6.4 Reflection journals

Reflection journals (Appendix D) were given to the children in DC2 to complete at home and in their own time. Moon (2006) advocates for journals to stimulate reflection and it was hoped that children might develop deeper layers of reflection about their experiences rather than the daily reflection sheet

done at the end of the day in the classroom or museum. Questions on the reflection journals were designed to communicate children’s thoughts and feelings on the cultural heritage learning experiences through writing and drawing responses.

#### 4.6.5 Fun toolkit

The Fun Toolkit (Read 2008, Read and Mac Farlane 2006) is a survey instrument designed, in the form of a questionnaire, to gather children’s opinions on technology (Read and Mac Farlane 2006). The toolkit (Appendix E) consists of a Fun Sorter, an Again-Again Table and a Smileyometer (Read and Mac Farlane 2006). The toolkit has been validated through many studies, and has been found to have potential for gaining a measure of children’s engagement (Read and Mac Farlane 2006) and for gathering children’s opinions on user experiences (Read 2008). In this research the *Fun Sorter* children ranked project activities in order of enjoyment. The *Again-Again* table asks ‘Would you do this activity again?’ for each stage of the interactive cultural heritage learning process. Children ticked a choice of ‘Yes’, ‘No’ or ‘Maybe’. The Smileyometer, a Likert type scale used to measure expectations prior to and after an experience (Read and Mac Farlane 2006) was applied to the pre and post intervention questionnaires (Appendix F). At the end of each intervention *Fun Sorters* and *Again-Again* tables were completed by the children in DC1 and DC2. With each design cycle, iterations and changing contexts there were slight changes in the number of, and listing of, activities (Table 4.2).

Table 4-2 Fun Sorters/Again-Again Tables - Iterations through Design Cycles

<i>Fun Sorter – Again/Again Table</i>			
	<b>DESIGN CYCLE 1</b>	<b>DESIGN CYCLE 2</b>	<b>DESIGN CYCLE 3</b>
	Fun Sorter (FS) Children rank activities in order of enjoyment		
<i>School</i>	(FS) (1 to 6 activities) (AG) (n=8 activities)	(FS) (1 to 9 activities) (AG) (n=9 activities)	N/A
<i>Museum</i>	(FS) (1 to 9 activities) (AG) (n=8 activities)	(FS) (1 to 9 activities) (AG) (n=11 activities)	N/A
	Again-Again Table (AG) - Children answer ‘Would you do this activity again?’ with Yes, No or Maybe		

#### 4.6.6 Video recordings

Video has emerged as a technology that can unobtrusively record aspects of human behaviour in natural surroundings (vom Lehn and Heath 2016). Video was used as a research method in the second design cycle of this research, with permission duly granted from the university ethics board. As the research evolved within the different contexts of school and museum, I believed video would enhance observations, and provide a deeper analysis of childrens’ natural actions and social interactions. Video recording and analysis responds to the growing importance of social interactions

in the study of society (Kissman 2009). In their use of video-based research into how museum experiences arise through social interaction, vom Lehn and Heath (2016) found social interaction was key to people’s experience of exhibits in museums. Video recordings therefore became an important research methods tool to explore children’s engagement with heritage.

4.6.7 Children’s questionnaires

A pre and post intervention questionnaire was designed to capture children’s attitudes, experiences, behaviours and learning in relation to heritage, history, learning, and computers (Appendix F). Both pre and post questionnaires contained the same wording and were designed to measure changes (if any) over the intervention time. No prior information was given to children on the pre-questionnaire in order not to influence their answers. Cohen et al. (2011) refer to the general rule of thumb in designing questionnaires; the smaller the sample sizes, the less structured, more word-based and open the questionnaire can be. Sample sizes were small in each intervention so a mixture of question types was employed (Table 4.3). Some questions included open-ended questions, others were comprised of Visual Analogue Scale (VAS) statements (Fig. 4.1). A VAS uses pictorial representations and is a widely used question format for children (Read and Mac Farlane 2006). The pictorial representations used in these VAS questions were of happy, neutral and sad faces.



Figure 4-1 Visual Analogue Scale

Table 4-3 Questionnaire Type Details

Questionnaire Types			
Pre and Post Questionnaire	DESIGN CYCLE 1	DESIGN CYCLE 2	DESIGN CYCLE 3
School	Paper-based 18 VAS, 0 open ended (pre) 18 VAS, 4 open ended (post)	Paper-based 15 VAS, 4 open-ended (pre) 15 VAS, 2 open-ended (post)	N/A
Museum	Paper-based 6 open-ended, 15 VAS (pre) 7 open-ended, 14 VAS (post)	Paper-based 15 VAS, 4 open-ended (pre) 15 VAS, 2 open-ended (post)	Online survey 12 open ended, 5 check boxes
Parents	Online survey- 3 open ended, 1 Star Rating Grid	Online survey- 3 open ended, 1 VAS	N/A
VAS: Visual Analogue Scale			

### 4.6.8 Survey methodology

Conducting surveys online are becoming commonplace in the social sciences (Cohen et al. 2011). SurveyGizmo.com was the platform used for the online survey in this research, it provided free survey templates, collated the participant's inputs and presented the results behind a private login.

#### *Parents*

A parental online survey in DC2, consisting of three open-ended questions and one Star Rating Grid, gave an opportunity for guardians to comment, from their perspective, on children's reported workshop experiences (Appendix G).

#### *Teenagers*

I asked teenagers in DC3 (museum in U.S.A.) to complete an online survey consisting of twelve open ended and five 'check box' questions, on their experience of the museum project (Appendix H). I sent reminder links by email.

### 4.6.9 Interviews and focus groups

One semi-structured interview was held with a primary school teacher prior to the research to understand the current state of heritage education in primary schools. I wanted to understand current teaching practice and classroom dynamics from Teacher1's perspective and to learn from her expertise rather than rely on assumptions I may hold about heritage teaching and learning within the primary school. I was curious to explore the interviewee's knowledge, behaviours (both present and future), opinions, values and feelings and believed that an interview would be the best choice, because "interviewing gives us access to the observation of others" (Gubrium and Holstein 2003, p.26). I chose a semi-structured interview as the method of enquiry. A semi-structured interview would allow Teacher1 the time and scope within the interview to discuss her teaching practices in more detail than that of a structured interview or a preliminary questionnaire (Cohen et al. 2011). This type of interview allows extensive opportunities for asking and probing (Cohen et al. 2011). Additionally, it would allow me observe body language, feelings and emotions, as these can " reveal deep truths about individual selves" (Gubrium and Holstein 2003, p. 29). I asked Teacher1 for permission to audio record the interview even though I was aware that recording can pressure a respondent (Cohen et al. 2011). Permission was granted to record and transcribe the semi-structured interview (Appendix I). Additionally, in DC1 I held an informal group interview with the school children after the intervention, at which the teacher was present. Group interviews are very suitable when interviewing children and for collective responses (Cohen et al. 2011) which can increase opinions and views available to the researcher (Denscombe 2010). Children feel involved, and can reflect on others perspectives and speak their minds (Denscombe 2010). The purpose of the group interview was to clarify meanings that arose during the data analysis, e.g. what did fun mean to them?

Focus groups as a form of group interview are growing in educational research (Cohen et al. 2011). Focus groups are not a one-to-one interview as between interviewer and interviewee but

FOCUS GROUPS	
School No.	No. of Children present
S2.3	6
S2.4	7
S2.5	12 (5 & 7)

explore perceptions, ideas, feelings and attitudes about certain topics; they are reliant on the group interactions, topic discussion and result in a collective response (Denscombe 2010). I carried out four in schools as part of DC2 iteration (Table 4.4).

*Table 4-4 Focus Group Statistics*

#### 4.6.10 Ethnographic observations

Observation is a complex research method (Baker 2006). It consists of using all the five senses, and through these human capabilities, we gather impressions of the surrounding world and witness the unfolding of the phenomena we are studying in action (Adler and Adler 1994, Hammersley 2012). Writing concrete descriptions in natural language is a natural part of observation but this was difficult as a sole researcher. Although field notes are interpretations of our experiences and not truly objective (Miles et al. 2014), after each session in DC1 I immediately recorded audio notes and reflections to transcribe later, taking due care to remember to remain objective. It was for this reason that video was used in the DC2, so as that my audio notes and reflections could be triangulated with video data and photographs.

### 4.7 Data Analysis

#### 4.7.1 Thematic analysis

Thematic Analysis is a method to determine, analyse and document patterns (themes) in the data (Braun and Clarke 2006). There is insufficient detail reported from some research in how themes are actually developed; themes often ‘develop’ and ‘emerge’ (Braun and Clarke 2006). In order to bring clarity to the process and practice of thematic analysis Braun & Clarke developed a flexible six-phase guide which is widely used and is accessible to beginning researchers (Braun and Clarke 2006).

Following their guide I:

1. familiarised myself with the data
2. generated initial codes
3. searched for themes
4. reviewed themes
5. defined and named themes
6. produced a report

The flexible approach of Thematic Analysis allows researchers actively choose their particular forms of analysis (Braun and Clarke 2006). Additionally, within Thematic Analysis the research question is not fixed and evolves through coding and theme development (Clarke and Braun 2016). The coding process is outlined in Table 4.5.

Table 4-5 Coding Process Overview

**Coding Process**

Analytic Stages	Authors	Details
<i>Familiarisation</i>	Saldaña (2013, 2016)	Miles et al. 2014
<i>Transcription</i>	Jefferson (1973)	(Heath et al. 2010)
<i>Analytic Memo</i>	Saldaña (2013, 2016)	
<i>First Cycle Coding</i>	Saldaña (2013, 2016)	Braun & Clarke (2006)      Elemental methods as from Saldaña 2013
<i>Second Cycle Coding</i>	Saldaña (2013, 2016)	Braun & Clarke (2006)      Focused, Pattern
<i>Theme Formation</i>	Saldaña (2013, 2016)	Identifying, selecting, reporting of themes
	Braun & Clarke (2006)	
<i>Theme review, refinement, defining</i>	Saldaña (2013, 2016)	
	Braun & Clarke (2006)	
<i>Final Report</i>	Saldaña (2013, 2016)	Thick rich description in analysis (Geertz 1973)
	Braun & Clarke (2006)	

4.7.2 Familiarisation with the data

Qualitative researchers need to know how to analyse people and their lives; social life, in its most simple form, encompasses action, reaction and interaction (Saldana and Omasta 2017). Getting to understand participants themselves and their perspectives was an important part when familiarising myself with the data. I did this in various ways, through multiple readings of the data, physically cutting up and handling printed data, visualising the data and in experimenting with data as poetry.

4.7.3 Coding methods

Coding is a system to make sense of our data by finding connections, patterns, questions and links to our research questions (Campbell Galman 2013). It is more often a word or a short phrase that captures the essence of visual or language-based data (Saldaña 2013). It is how we define what the data being analysed are about (Gibbs 2007). The code is researcher constructed and gives meaning to each of the datum for later analytic purposes, i.e. pattern detection, categorisation and theory building; therefore it is an interpretive act (Saldaña 2013). The coding framework drew on thematic analysis methods (Braun & Clark) and Saldaña’s (2009, 2016) first and second cycle coding approaches. An analytic memo proved invaluable in developing codes and thoughts on the coding process,

## Chapter Four Methodology

emerging categories, themes and concepts. The initial coding (DC1) was done manually, in that codes were typed, printed, cut up and physically placed into categories (Appendix J). Once I was confident in coding, I colour coded data using Excel, reorganised into new category lists, and from these condensed further into themes (Appendix K). Coding details are in the individual design cycle chapters.

### *1<sup>st</sup> cycle coding methods*

All first cycle data was coded using Elemental methods as well as drawing on Affective, Grammatical and Exploratory methods (Saldaña 2016). Elemental methods included *Descriptive, In Vivo, Structural* and *Process* Coding. Affective methods included *Values* Coding (Values, Attitudes, and Beliefs). Exploratory methods included *Holistic* Coding. Grammatical methods included *Attribute Coding* (Saldaña 2016). To ensure rigor in the coding process, several different types of coding mentioned above were explored in DC1 (Table 4.6).

*Table 4-6 Coding Framework Overview*

### *Coding Framework*

Stage	Analysis	1 <sup>st</sup> Cycle Methods	2 <sup>nd</sup> Cycle Methods
<b>DC1</b>	Inductive (All coding types, focusing on Process and Descriptive) Thematic Analysis	7 coding types initially, then, Process and Descriptive	Focused Saldaña (2016)  Braun & Clark (2006)
<b>DC2</b>	Deductive Inductive Video Analysis		Saldaña (2013) Derry et al (2010) Ash (2009) Erickson (2006)
<b>DC3</b>	Inductive Thematic Analysis	5 Coding types initially, then Process	Pattern Saldaña (2016) Braun & Clark (2006)

As DC1 was an exploratory pilot study, I employed an open coding inductive approach as in Grounded Theory, where theory emerges from, and is ‘grounded’ in the data themselves (Charmaz 2006). Experimenting with the different methods enabled me to get a feel and learn about coding and the benefits of each type. Saldaña (2013) suggests a combination of basic coding methods as a ‘generic’ approach to data analysis and he lists them in a specific order. Following his advice I started with Attribute Coding, followed by Holistic, Descriptive and then both In Vivo and Initial coding (Table 4.7).

Table 4-7 DC1 First Cycle Coding Methods

*First cycle coding methods undertaken (Saldaña 2013)*

<b>Attribute</b>	A basic description of e.g. a school, participant’s details, carried out at the beginning of a data set.
<b>Holistic</b>	Applies a single code to a large corpus of Data. Captures a sense of the overall contents. <i>Holistic</i> is more exploratory in nature and good for beginners.
<b>Descriptive</b>	Summarise the basic topic, what written or talked or about rather than the content or substance of the message.
<b>In Vivo</b>	Draws from the exact words of a participant. It is relevant to children’s data as it can give voice to emotions experienced by a child. Saldaña recommends using it for first cycle methods and then standardising labels in the second coding cycle, unless the <i>In Vivo</i> code captures the experience and in which case to keep the code.
<b>Initial</b>	Similar to Process coding
<b>Process</b>	Captures action, interaction and emotion in the data (Corbin & Strauss 2008 cited by Saldaña 2013). Uses gerunds exclusively for codes.
<b>Values</b>	Values, attitudes, beliefs. This coding I found was most applicable in DC3. Participants were a smaller group, older (aged 15-18) and were open in nature. I could observe if what participants stated as their values, attitudes and beliefs were truthful, or if the <i>Values</i> attributes triangulated with their interactions and actions. Values, attitudes and beliefs proved harder to find in younger children’s’ data.
<b>Structural</b>	Applies a conceptual or content-based phrase. Is foundation for further coding and is driven by a particular research question.

I took the decision to apply several coding methods to certain parts of the data to ensure rigour, and to make certain the resulting themes would be trustworthy and credible. It was a means of cross checking my processes. When deciding on which type of coding method to use, I took a three-week sample data set from DC1 and using several coding methods, brought the data set through an analytic process from codes to categories to themes. As Saldaña pointed out when a student of his tried a similar think “he learned that applying the two coding methods sequentially gave him a richer perspective on the same data set” (2013, p. 63). I gained extra insightfulness, awareness, and was drawn closer to the data and to the participants’ experiences. From this small but important coding experiment, themes brought similar results. Therefore, from then on I applied both *process* and *descriptive* coding (depending on context) to all the other data collection. Inductive coding is a bottom up approach (Creswell 2003). Data are organised into more abstract units of information in an inductive process of back and forth between database and themes until a comprehensive set of themes is established. Creswell (2003) adds that at this point to move the analysis forward, one can look back deductively at the data to gather more information or to gather more evidence to support the themes. I found this approach useful in the overall data analysis. Details of coding are outlined in the relevant design cycle chapters.

There is a transition between 1<sup>st</sup> and 2<sup>nd</sup> cycle coding. Transition methods help reorganise and reconfigure work in first cycle methods included reanalysing the data, constructing new categories





without at this point distracting attention to their properties and dimensions (2016, p. 240). Focused coding allowed searching for the most significant or frequent codes and categorising them based on their conceptual similarities. Within the relevant design chapters, a conceptual map of the final categories was drawn up and relationships noted in order to develop the emerging themes and gain deeper insights into analysis of themes. In DC2 the main source of data was video coding. Both inductive and deductive methods were employed which are discussed in detail in the relevant chapter. In DC3 I found pattern coding to be the most appropriate (Miles et al. 2014, Saldaña 2016). Pattern Codes are inferential or explanatory codes and identify emergent themes, structure or explanations (Miles et al. 2014). As humans we automatically process information into patterns (Miles et al. 2014), therefore care had to be taken not to rush into naming patterns. Keeping this advice in mind, I believed pattern coding would help me categorise and clarify the analytic work of DC3 even further.

### 4.7.4 Theme development and refinement

Categories and sub categories of the data were formed from the codes. Themes were formulated from the categories. Themes are the outcomes of coding, categorisation and analytic reflection (Saldaña 2013), they are sentences or extended phrases that identify the meaning of the units of data (Saldaña 2013). Braun and Clarke (2006) define a theme as grasping something important about the data with regard to the research question and it represents part of the *patterned* meaning in the data (p. 82). In this study thematic analysis approach involved searching for, reviewing and defining themes (Braun & Clark 2006). As per Braun and Clarke (2013) I used visual thematic maps to structure the themes and to develop the final form of the analysis. These visual aids were vital in exploring and refining connections between codes and themes, themes, subthemes and overarching themes. Saldaña (2013) suggests analytic goals should aim to reduce down the number of themes, to form an overarching theme for the data or to weave themes together in a clear narrative. More themes aren't necessarily better (Braun and Clarke 2013). As can be seen in the separate design cycle chapters, themes were identified, selected, and reported on in a thick rich narrative (Geertz 1973) and kept to a minimum to keep the data coherent (Braun and Clarke 2013, Saldaña 2013).

### 4.7.5 FRAMES

To ensure rigor in the analytic procedure, in the synthesis of the categories, and subsequent themes I adapted the six-part FRAMES analytic method to DC3 (Campbell Galman 2013). Within DC3 each weekly session was coded and analysed separately before bringing all individual analyses together (Numbers 1-4). Numbers 5 and 6 in the model served as the discussion sections which was done after the analysis of the data. Separating the analyses into the individual weeks allowed for a

more detailed analyses, more clarity and less cognitive overload. (See Appendix L for one week's example).

FRAMES acronym stands for:

1. **F**ocal Statement or the theoretical Sentence (or Assertion (Erickson 1986) cited by Saldaña (2016)
2. **R**ich thick description
3. **A**nalysis
4. **M**eaning
5. **E**xpansion of the ideas or implications
6. **S**o What?

### 4.7.6 Analytic memos

In this research process I used analytic memo writing which is open reflexive writing to aid interpretation of all aspects of the data (Appendix M). The purpose of writing analytic memos is to document and reflect on your processes of inquiry, your coding processes and choices, your emergent patterns, categories, concepts and themes, all which potentially leads towards theory (Saldaña 2013). Building memos on research concepts results in strong, clear analyses and contributes to theory building (Charmaz 2006). These memos should not be written in academic prose but as if you were writing to a friend (Charmaz 2006), similar to blogs and journal entries and 'what is going through my mind' (Saldaña 2014, p. 43).

### 4.7.7 Code book

A coding scheme or code book is an organised list of codes and is created at the familiarisation stage of the analytic coding process (Appendix N). A key function of recording codes is to note the type of code and the thinking behind it, and to explain how, and to what, the code should be applied (Gibbs 2007). A codebook allows the researcher be consistent in their coding consistency being especially important when working in teams (Gibbs 2007). The code book in this research lists the codes developed, a definition of the code and an example of how the code was used. The code book was updated throughout the research process.

### 4.7.8 Transcription

I transcribed the data (focus groups, children's audio and video reflections). I believed, as per Braun & Clarke (2006), transcription was an important part of the analysis process enabling familiarity with the data. Transcription of some audio and video recordings followed the Jefferson method (Heath et al. 2010). This method is used in Conversation Analysis to transcribe talk (Appendix O) and which has

now become standard (Erickson 2006). The Jefferson method (Jefferson 1984) uses symbols and punctuation to reference phenomena in written speech; stresses and accents on words or part thereof, utterances, overlaps, pauses, and tones through the transcription show changes in tone of voice, volume of speech, etc. An example of Jefferson transcription follows:

The length of pauses or silences (in tenths of a second) are given in brackets – as in (4.6) in the example above, when a word or part of a word is emphasised it is underlined, and when a sound is stretched or elongated it is extended by a number of colons (the number of colons capturing the length of the sound), as in ‘down:.’

(Heath et al. 2010)

According to Braun and Clarke (2006) when carrying out thematic analysis in research, audio and video recordings may not require the same level of detailed transcription that a Conversation Analysis approach needs. They do however stress that transcription must be rigorous and orthographic with care and attention to punctuation as it affects the meaning (Braun and Clarke 2006).

### 4.7.9 Poetry analysis

Poetic displays are selected data arranged into poetic and traditional structures for the evocative presentation and representation of a participant’s perspective, the study itself or its findings (Miles et al. 2014). These poetic displays and vignettes can capture important moments in field work and serve as a way of capturing core meanings and essence (Miles et al. 2014, Pahl et al. 2020); poetic inquiry having the potential to reveal connections is often overlooked in traditional research approaches (Leavy 2015, Pahl et al. 2020, Richardson 1992). I used different forms of poetry to understand children and parents experiences through the data. Poetic forms such as *Haiku*, *Tanka*, *Cinquain*, and *Free Verse* were experimented with to explore and represent children and parent’s perspectives (Table 4.9). Individual children’s reflection pieces and parents reflections/survey responses were counted for syllables and those that fitted into the above poetic forms were included in a relevant poem. Care was taken to ensure the data was not out of context which could otherwise distort the meaning. I used only verbatim data with the exception of one word which was changed from ‘boring’ to ‘bored’ to suit the rhyming pattern in the *Free Verse* poem (Fig.5.30). Each reflection piece (datum) was divided into sentences and then syllables. According to the number of syllables it was included for selection in the appropriate type of poem. If the reflection had four syllables it was included for selection in a *Cinquain*, if it had five syllables it could be included in a *Haiku* or *Tanka*. All data was considered for the *Free Verse* poetry. From each poem a holistic code was recorded, holistic by the definition of Saldaña (2013); a sense of the overall contents e.g. *Engagement*, *Teamwork*, *Interest* as

in Table 4.9. Other codes recorded included *A Different Experience, Inspiration, Electric, Flow, Balance, Change, Alone, Fairness, Teamwork*, to name but a few.

Table 4-9 Types of Poetic Forms

Types of Poetic Forms		
<b>Cinquain:</b> 5 lines, 2-4-6-8-2 (number of syllables in each line)	<b>Haiku:</b> 3 lines 5-7-5 (number of syllables in each line)	<b>Tanka:</b> 5 lines , 5-7-5-7-7 (number of syllables in each line)
<p><b>Engagement</b></p> <p><i>Time Flew</i>  <i>Glad I signed up</i>  <i>Forgot about the lunch</i>  <i>I liked when he showed us the sword</i>  <i>Fun day</i></p>	<p><b>Teamwork</b></p> <p><i>Really enjoyed</i>  <i>Accomplish a common goal</i>  <i>Working in a team</i></p>	<p><b>Interest</b></p> <p><i>Interest he showed</i>  <i>Loved working on the iPads</i>  <i>Thoroughly enjoyed</i>  <i>Really like the setting</i>  <i>Recognised the relevance</i></p>

#### 4.7.10 Quantitative analysis of qualitative data

##### NVivo

I was curious about the QDAS (qualitative data analysis software) package NVivo as a method for coding qualitative data. NVivo is a set of tools to help when undertaking qualitative data analysis (Bazeley and Jackson 2013). I attended two workshops early on in my research and experimented with NVivo’s features (Appendix P). However, I wanted to have an active role in the coding of the data and not to feel distant from the research data (Gibbs 2007). Additionally, I believed I was being thorough with the manual and Excel coding I was carrying out at the time. I believed the hands on approach, handling the data and going back and forth in the analysis myself, and being aware of the contexts, would result in a deeper connection to the data and therefore to children’s experiences. Therefore, I made the decision not to continue with NVivo.

#### 4.7.11 Video analysis

Video was employed as a data collection method in DC2 (principal study). Video is rich for capturing data (Plowman 1999), is powerful for analysing data on social interaction (Heath 2010) and on teaching and learning (Derry et al. 2010). Video data and analysis is discussed in detail in DC2 chapter.

#### 4.7.12 Student artefacts

Brown (1992), one of the founders of DBR differentiates between the ‘traditional classroom’ and the ‘Intentional learning environment’. Rather than traditional tests and fact retention for assessment purposes she advocates for knowledge discovery and utilisation, understanding, performance, projects and portfolio. The artefacts, digital and otherwise that participants in this thesis produced followed that learning ethos. Therefore, there was no assessment of participants work, but their

digital and otherwise pieces formed part of the overall data analysis under the theoretical framework detailed in chapter four.

### 4.8 Ethical Considerations

Knowledge of, and reflection on, ethical guidelines emanated from a Research Ethics module for structured PhDs at this university. We were afforded, over a semester, an opportunity to discuss our proposed ethical practice with our peers. Literature discussions proved invaluable in developing lived ethical awareness, one which was very much to the forefront in carrying out this research. Additionally the research drew on British Educational Research Association (BERA 2011) ethical guidelines. Prior to the research, vetting was obtained from the Garda Síochána (Irish State Police force). Permission was granted by the National University of Ireland, Galway for initial research in 2015 and in 2017 permission for video and audio recording was duly added. Ethical protocols were discussed with staff members at the Galway City Museum and the Exploratorium Museum, San Francisco and I was granted permission to carry out research at their institutions.

#### PARTICIPANTS

Participants in this research included children and teenagers. In schools voluntary participation was from 4<sup>th</sup>/5<sup>th</sup>/6<sup>th</sup> class pupils from voluntary participating schools. In the local museum, voluntary participation was from children age ten to thirteen. In the North American museum voluntary participation was from teenagers aged fifteen to eighteen. Additionally parents, teachers, school principals, school board of managements and museum educators were fully informed of the research. All ethics documentation can be found at Appendix Q.

#### CONSENT/ASSENT

The purpose of the research as well as the proposed opportunities for children were outlined in information sheets given to the stakeholders. Letters stressed the focus on ties with the existing school curriculum, physical interaction with local heritage, digital learning, problem solving and creative skills, collaboration, co-creation (leading to sense of ownership, belonging and place), development of empathy by children for each other through connecting with their Irish identity and/or hybrid-identities. Additionally the project was outlined to children and teenagers orally and within the Irish research contexts, a child-friendly leaflet was produced for their perceived level of reading. Initial meetings were held with every teacher (four in total) and details of the programme outlined. Once permissions were granted by the schools I explained the programme to the children. Children were informed of the project details and the reasons for requesting signed consent by them and their

## Chapter Four Methodology

parents/guardians. They were encouraged to ask me any questions to ensure they were all happy with participation.

### VOLUNTARY

Children were informed participation was voluntary and they would not be left out if they decided not to partake in the research. Throughout the project they were reminded of their right to withdraw at any time for no reason, without prejudice. I strived to develop a relationship with them to ensure I could note any potential negative aspects of their involvement with the programme. The same applied to the teenagers in the Exploratorium Museum. Although the Explainers were employed by the museum (their job is to engage visitors with the exhibits, run demonstrations, building their own skills as they help others (Exploratorium Museum 2019), the museum agreed to allow potential participants volunteer for the project. I pitched my project to the Explainers and those that were interested volunteered to participate.

### CONFIDENTIALITY

I assured teachers and youth on their privacy and confidentiality of the project. Although children and teachers signed information sheets for the use of images for publication and dissemination of research I do not identify children's faces in this thesis as to ensure their present and future privacy rights. Pseudonyms are used throughout this thesis, locations are not specified and participant quotes are anonymised.

### GENDER BALANCE

Gender balance was important consideration of the ethical protocol as well as the location of schools. A city school, one town boy's school and one town girl's school, all with children of diverse nationalities were chosen for participation as well as a midlands rural school which was made up of native Irish pupils.

### VOLUNTEERS

For the second cycle of this research I recruited, through the university student volunteer office at NUI Galway, three volunteers to help with the workshops. The ethics protocol was discussed with each person before they accompanied me to the school or museum. Each volunteer was approved for Garda vetting and teachers' permissions were requested and granted in advance.

### SENSITIVITIES/CONCERNS

From the beginning of my research and before I received ethical approval I was concerned about a few aspects of the research. One concern was regarding children who were not Irish natives and the view of imposing my heritage on theirs. During the research I was conscious and aware of any potential imposition, but thankfully this did not serve a problem. Post research I have ethical concerns my

research might be used or re-used by others. In order to minimise that happening I have embedded ethical awareness into my design informants which form part of the dissemination of the research.

### DATA PROTECTION

Data will be retained for a period of five years and then destroyed. Data uploaded to the project website is kept in a separate hard drive in a secure storage locker in the Hardiman research centre at NUI Galway. The TEChE website had a logon facility that only registered children could access which I regularly monitored.

### VIDEO RECORDING

Ethical issues were discussed with the University Ethics Board on the use of video recording before permission was granted. A high ethical awareness was required on my part throughout the time video recordings were in use in schools and in the museum. Video is for analysis only and not for publication. It is only available to my supervisors and me for research purposes.

## 4.9 Chapter Summary

In this chapter I introduced my research questions and my educational paradigm. I presented the research methods employed in this study. The overarching research method is Design-Based Research (DBR). Forming part of DBR is a qualitative approach. DBR was chosen as a methodology to help answer the research questions and because of its flexible, interventionist, iterative approach to designing guidelines for educational practice within natural educational settings. I explained my rationale for using DBR as well as the origins, characteristics, strengths and challenges of the methodology. I outlined and explained my rationale for the data collection and research methods, chosen to help address the research question; *how best to design for children's engagement with cultural heritage using technologies across formal and informal learning environments*. I explained the data analysis methods employed, which will be expanded on in the next three chapters. I addressed the ethical considerations regarding voluntary consent, confidentiality, working with children, video recording and data storage.

The next three chapters detail the three individual design cycles. DC1 and DC2 are carried out with children aged 10-13 in schools and a museum in Ireland, and DC3 with teenagers aged 15-18 in a North American museum. The TEChE prototype model of engaging children with heritage across schools and museums evolves through DC1 and DC2. As with DBR the prototype model should be adaptable and adoptable by others. An adapted form of the prototype is transferred to a new learning context in DC3.



## Chapter 5 Design Cycle One

This pilot cycle of the research was carried out in two different learning environments, one in a local city primary school and the other in Galway City Museum. Initial discussions took place with the class teacher and the museum's education officer. Both kindly gave permission to carry out the research study. The Ethics Board of the University equally granted permission for the study. A strong ethical awareness was upheld during the project. Each week participating children were reminded they could leave at any time; although present in the classroom children were not obliged to participate. I sought permission from children to take photographs. Children were encouraged to let their parent/guardians know they could contact me at any point via phone, email with any concerns or questions. The intervention was based on the Irish school *Social Environmental and Scientific Education* (SESE) curriculum for 5<sup>th</sup> and 6<sup>th</sup> classes (NCCA 1999) which encompass the subjects of History and Geography. Heritage and place come under the umbrella of the subjects of History and Geography. However the main interest of this thesis related to the discipline of history more especially 'local history'.

### 5.1 Project Layout - School

The school intervention took place over a ten week period (each session two hours) from January to April 2016. Twenty two children from 6<sup>th</sup> class (aged between ten to thirteen years) took part in the study called *Project TEChE* (Technology-enhanced Cultural Heritage Education). The class was a diverse set of young people with origins in Asia, India, Pakistan, continental Europe and Eastern Europe. The overall design plan to include a guided walking tour of medieval Galway, a visit to the city museum (which did not materialise), DST with Minecraft and recording of their collective story in a recording studio. The aim was to co-create a collective learning resource for the primary school 'Local History' curriculum of which heritage is a part. Lesson plans were drawn up to facilitate this plan (Appendix R).

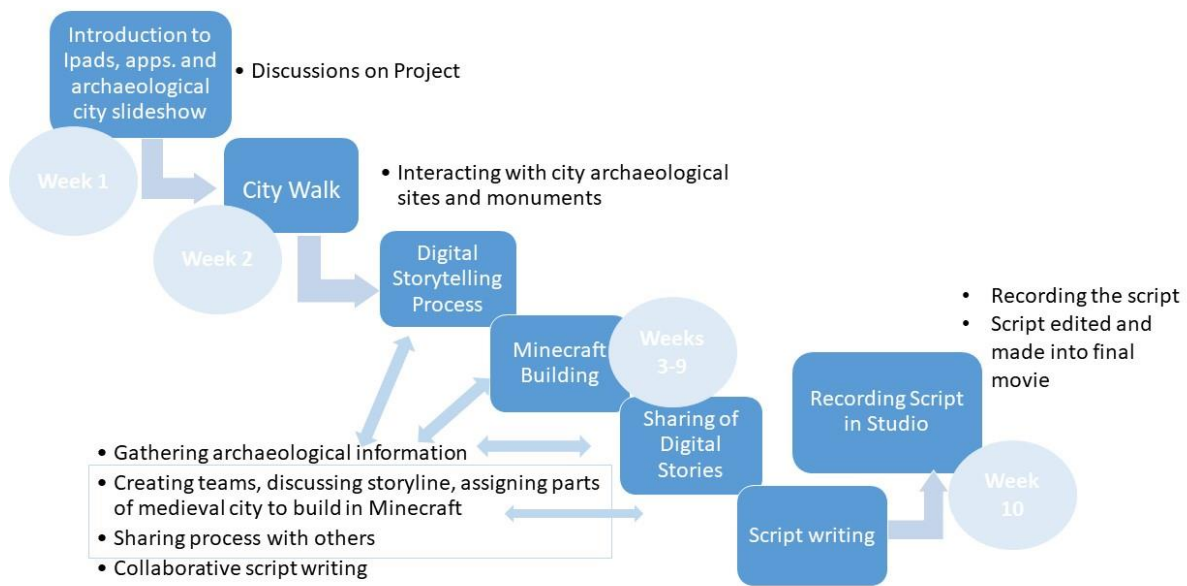


Figure 5-1 DC1 S1.1 Ten-week Project Plan

**WEEK ONE**

Week one served as an introduction to myself and to the project. It also served as an opportunity to



Figure 5-2 DC1 S1.1 Digital Citizenship Bookmark

develop rapport with the children and find out whether they were familiar with Minecraft (19 out of the 22 played the game) and their level of technology use as in emails (which majority had). I explained to the children about the website ([www.teche.ie](http://www.teche.ie)) which I had set up with private areas in which I aimed to continue the learning outside of the classroom (Figures 5.4 and 5.5). I discussed digital citizenship and handed out bookmarks with a space on the back for the children to compile four rules each of their choosing (Fig. 5.2). I asked the children to return them so as we could discuss further before any online activity. One was returned.

**WEEK TWO**

This week I demonstrated the technology tools we would use including how to register, login, download an avatar for anonymity etc. I had the use of eleven iPads over the course of the project which were all loaded with an email and an Apple ID each. Applications (apps) were downloaded to a folder called *TEChE* on each iPad and these included *Minecraft*, *Skinseed* (for changing avatar

costumes in *Minecraft*), *Comic Life* (Importing text and images to make comics), *Speakpipe* (children could record individual audio reflections which were set up to email me directly) and *Today's Meet* (a



Figure 5-3 DC1 S1.1 iPad TEChE Folder of Apps

backchannel chat platform for classroom use) (Fig. 5.3). I used the classroom interactive whiteboard to demonstrate use of some of the apps and had intended to show YouTube clips such as a 3D video of medieval Galway and animation of the Norman Bayeux Tapestry to spark an interest in medieval times. Technical issues arose at this stage as some websites (e.g. You Tube) were blocked and permissions had to be granted by the PDST (Professional Development Service for Teachers, Department of Education and Skills) to

enable access. There were also Wi-Fi issues. While the teacher and I were sorting the technical issues I passed around some medieval tiles borrowed from the School of Archaeology. However I did not observe any interactions with them as the children were preoccupied with playing with the iPads. From my perspective it was a frustrating session as we did not cover the lesson plan I had prepared and the realisation that technical issues could continue over the weeks ahead.



Figure 5-4 DC1 S1.1 Project TEChE - example of private page once user logged in

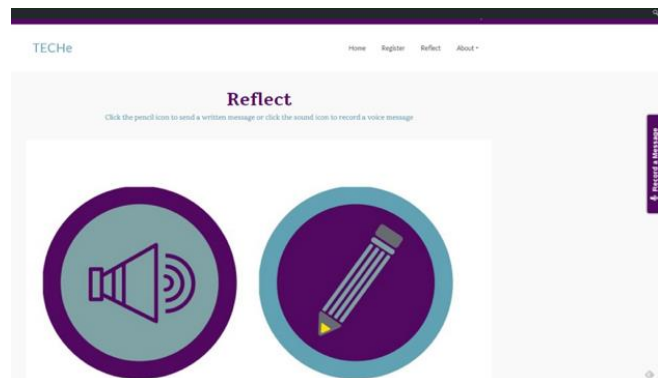


Figure 5-5 DC1 S1.1 Project TEChE- reflections audio and written

### WEEK THREE to SIX

Week three involved a guided walk around Galway city's archaeological monuments and sites with a young local guide who involved children in lively discussion on the medieval city. I handed out an activity trail to children. They mapped sites on a present day map during the tour. The majority of the children had never been to the main archaeological sites, 9 of 22 children had been to the *Spanish Arch* and 3 of 22 children had been inside 13<sup>th</sup> century *Red Earl Hall*. The children also brought the

iPads with them to take pictures of anything that piqued their interest. After the field trip back in the classroom I asked them to write two paragraphs for homework on what they might like included in the story we were to make together as a group. This was to encourage thinking for the collaborative scriptwriting in the upcoming weeks. Homework was shared on the interactive whiteboard when scripting later in the project.

In week four children were divided into groups by the teacher with each group choosing their team names. The children were not happy with the teams and there were many complaints. We had a discussion on working well within a team as well as deciding which groups would build which areas of the city as part of the story and towards the final collective video. Team members chose a rule for their group which included being nice, kind, listen to each other, no trolling or grieving in Minecraft (annoying and angering people), and to do everything together. The objective of this week was to clarify the story and begin a collaborative script. We discussed the purpose of the story and the main theme or idea that we would want other children to know after watching the final movie. Unfortunately collaborative scripting did not materialise until approximately ten minutes to go in the two hour session at which stage conversation began to flow. Within that time we got the bare bones of a story. Children were given storyboard sheets to fill in over the week to encourage thinking and planning of their story.

In week five, two software engineers from SAP, a global software and technology company based locally, kindly agreed to help with the sessions as part of their community outreach programme. They had advised me on game servers etc. prior to this session which were set up and ready to go. However within the two hour session there were technical issues which could not be resolved. 'Creative Mode' in Minecraft would not work, therefore this meant having to change hosting to another game server. We were all disappointed and got no work done this week as a result.

In week six, both software engineers returned and this time they helped with the structure of building the story and city within Minecraft. Again there were a few technical issues regarding updates



Figure 5-6 DC1 S1.1 15th Century Laws Incorporated into Minecraft

on the server and which the engineers worked on. We discovered only 5-6 iPads would work at the one time so the engineers additionally worked on solving this problem. In the light of ongoing technical issues I asked the engineers would they come for another week and they gladly obliged. In the meantime children went into their teams and everyone began working. I displayed a copy of a 1650s map of Galway (earliest map in existence) on the interactive

whiteboard and children were encouraged to come to the whiteboard and explore their chosen areas. I handed out and a sheet of laws from 15<sup>th</sup> century statutes of Galway translated to simpler language

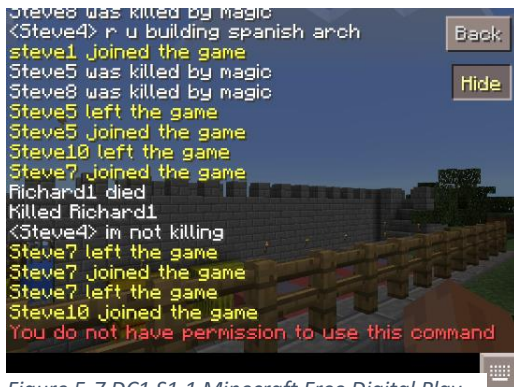


Figure 5-7 DC1 S1.1 Minecraft Free Digital Play

for them to optionally include in their stories (example of ‘butter laws’ in Fig. 5.6). I was there to help with ideas and questions and the software engineers helped the children start on their building. There were a few tensions with lag (Minecraft servers being slow) and some children disrupting the building work of other children (Fig. 5.7). There were tensions in groups as with shortage of iPads because of server issues there was only one iPad per team. Sharing was a problem and

we discussed how everyone on the team (4 to 5 members) had to get equal chances of building. The teacher informed me of ongoing problems with children logging on to the project website. Five children had successfully done so, however at this stage and with the time constraints caused by technical issues I made a decision not to go forward with intended project work on the website.

### WEEK SEVEN

The software engineers had brought some iPads home the previous week and returned this week with



Figure 5-8 DC1 S1.1 Children Presenting Story Process

the technological issues sorted. This increased the iPads to two per team which pleased everyone. Children worked on their stories with each team making progress in their digital artefacts (Appendix S). At the end of each week children presented their process to their peers. In this example children share their Minecraft world with the class (Fig. 5.8).

### WEEK EIGHT

During week eight we continued on with building in Minecraft. There were tensions that involved children getting lost in Minecraft worlds and there was some ‘messaging’ going on while playing the game. Some children were sending ‘stuff’ through invisibility potions (potion makes player invisible to other players) and spawning other children’s worlds (from spawn eggs, animals or mobs can appear out of nowhere). After a complaint I discussed with the class about playing fair. However, when another team complained the teacher stepped in resulting in the questioning of two children. All was



well again until the teacher left the room. Some children were messaging each other through



Figure 5-9 DC1 S1.1 Minecraft Screenshot of Chats

Minecraft and were causing other children to be upset (Fig.5.9). At the same time there was plenty of work being done by the children. I had edited a short movie of their presentations from the previous week and showed it to them at beginning of class so as they could see the whole city coming together. On seeing others work, one team added an interior hall laid out for a feast, another added ships to their harbour (Appendix S). There were severe time constraints throughout but this week the children were all under pressure to finish their building as it was the last day for building in Minecraft.

### WEEK NINE

Today the children were getting Easter school holidays so they were very excited and hyped. However we had to get the script finished today within the allocated time. As the script was being adapted children added small extra parts (e.g. signposts) to their Minecraft worlds. Two children were given the job of developing in Minecraft the *Long Walk* which is a present day city area included in the story and was needed for the final movie. Both children got it done within the class and displayed great pride in showing to the others. I had prepared another small snapshot of what the final video might look like, taking small snippets of their previous weeks work. I added characters named by the children as Olyver and Agnes who were the fictitious medieval children in the story. I had added some music and explained the process of adding children’s recorded script. The children were excited to see their work and characters come to life. When class time was finished I explained to the children how I would write out fully their script and have it ready for them for the following session when we would record it in a recording studio.

### WEEK TEN



Figure 5-10 DC1 S1.1 FLIRT FM Recording Studio

In week ten the children came to the University to the *Flirt FM* recording studio (Fig. 5.10). I printed out the script, numbering the different speaking parts to make sure there was at least one line for each child. In conjunction with the teacher I selected two children to record the parts of the main characters Olyver and Agnes. All the other children took turns in narrating the story and came into the recording studio to record their line(s).

## **POST-PROJECT**

A post-project visit included thanking the teacher and children, watching the final video (Figures 5.11, 5.12), carrying out a group interview and holding an informal project discussion with the teacher.



Figure 5-11 DC1 S1.1 Showing of Minecraft Movie on Medieval Galway



Figure 5-12 DC1 S1.1 Minecraft Medieval Galway Images

## 5.2 Findings and Discussion

### 5.2.1 Data Collection

The project gathered data in five different ways:

- Children's weekly reflections
- Pre and post-questionnaire (included eighteen VAS statements on their opinions on history, the history of their area and their community, learning with peers, learning history with technology and if their heritage is of importance. However, because of an error on the post-questionnaire where a possible mix up occurred between MAYBE and NO Smiley face responses, the data was considered flawed and only the YES findings are included in the discussion (Appendix F)
  - Post-questionnaire included four open ended questions (on learning, views on learning with technology, and fun in learning) (Appendix F)
- Researcher reflections
- Fun Toolkit (Again/Again Table and Fun Sorter) (Read 2008, Read and Mac Farlane 2006)
- Group interview post-project with children

### 5.2.1.1 Coding methods

Coding framework drew on thematic analysis methods (Braun & Clark 2006) and Saldaña's (2009; 2016) first and second cycle coding approaches.

#### 1<sup>st</sup> cycle coding methods

All data was inductively coded using elemental methods as well as drawing on affective, grammatical and exploratory methods (Saldaña 2016). Coding types and methods are detailed in chapter four (Methodology). I kept an analytic memo to keep track of emerging codes and categories and to help with my thinking and synthesising of information. I recorded emerging codes and their definitions in a manual code book (Appendix N). I followed the transition methods advice as outlined by Saldaña (2016) including reanalysing the data, constructing new categories from first cycle categories, drawing models of the data and creating visual word clouds. During the coding process I coded a sample (three weeks) of children's reflections gathered over ten weeks with the seven different coding methods (Table 5.1). I chose to continue the coding process using process coding. The initial process codes from all weeks coding were reorganised into new categories and sub-categories and from these condensed further into themes (Fig. 5.13).

Table 5-1 DC1 S1.1 Coding Methods

Coding Types Used	Descriptive	Holistic	Process	In Vivo	Structural	Values	Attribute
SCHOOL							
Sample of 3 weeks (27th January, Feb 3rd, 9th March)	√	√	√	√	√	√	√
All Weeks (10 weeks)			√				



Enjoyment/Liking/Interested	Technology (ipads)	Class Time	Peers
Liking class time	Feeling great about learning history with technology	Finding classtime fun	Liking presenting work to others
Liking groups	Feeling great because learning history with technology its fun	Finding class fun	Really liked playing minecraft with friends
Liking story idea	Feeling great because learning history with technology is helpful	Finding class time fun	Liking getting team
Liking drawing the storyboard	Feeling good about learning history with technology	Finding class time fun	Enjoyed teamwork
Liking brainstorming ideas for story	Finding learning history with technology 'really fun'	Finding class time fun	Realising team communication could be improved for project improvement

Figure 5-13 DC1 S1.1 Example 1st Cycle Coding – Categorisation of Process Coding UOMs

### 2<sup>nd</sup> cycle coding methods

I chose focused coding for the 2<sup>nd</sup> cycle of coding which I believed suited this intervention data (Miles et al. 2014, Saldaña 2016). Focused coding searches for the most significant or frequent codes and categorises them based on their conceptual similarities (Saldaña 2016). Throughout this time the analytic memo proved invaluable in developing thoughts on the coding process, categories, themes and concepts emerging. After the initial coding through the two cycles I created a conceptual map of the final categories, which helped note the relationships between the categories in the development of the emerging themes (Fig. 5.14).

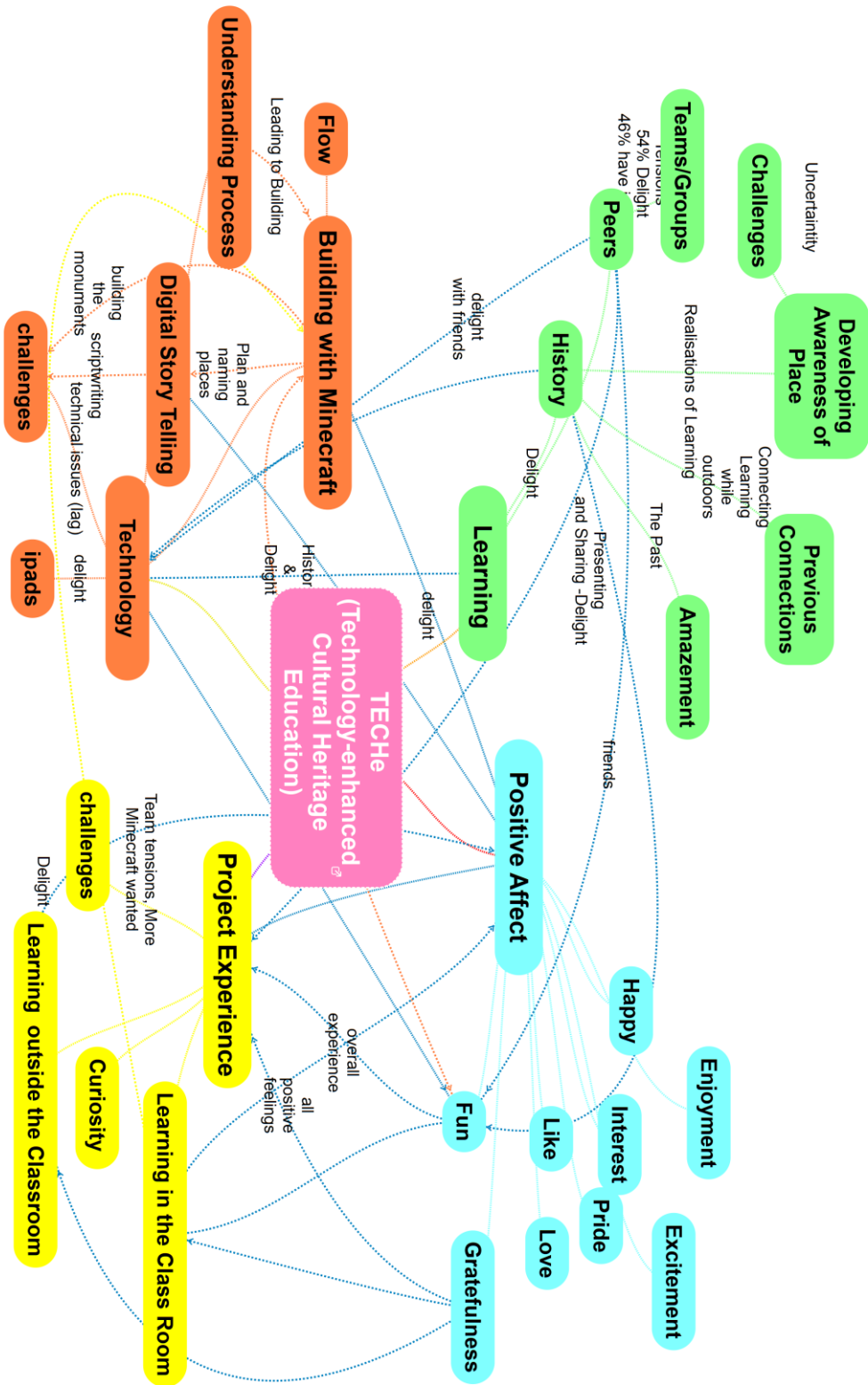


Figure 5-14 DC1 S1.1 Visual Concept Map - 2nd Cycle Coding

The findings can be reduced to one overall arching theme 'Learningful Play' with three sub-themes of *Positive Affect*, *Learning*, and *Building And Creating* (Fig. 5.15). Examples of children's quotes for the individual findings are detailed in Appendix T.

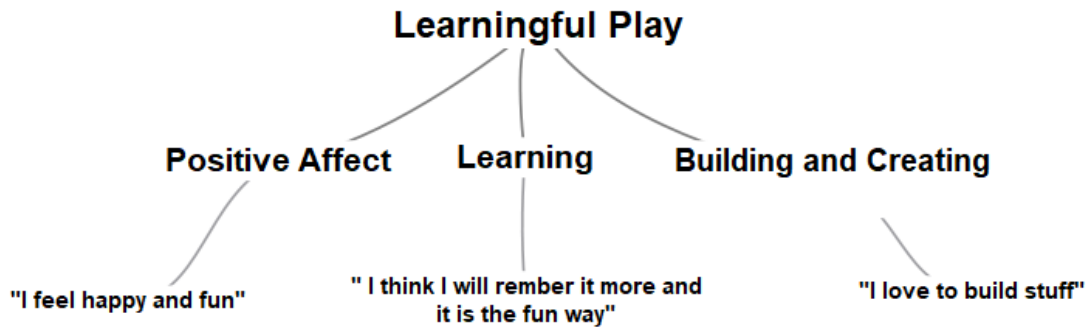


Figure 5-15 DC1 S1.1 Overarching and Sub themes

## 5.2.2 Themes

### 5.2.2.1 Learningful play

It became clear throughout the coding process a positive learning experience was emerging from the data. Of the 134 reflections (447 UOMs) for the formal school part of DC1, all except two included feelings of positive affect. As mentioned earlier, Mitch Resnick (MIT) coined the term 'learningful play' which is the combination of play, technology and learning (2006). 'Learningful play' summed up the school intervention's categories and themes and became the overarching theme. Three subthemes of *Positive Affect*, *Learning* and *Building and Creating* represent positive affect, learning, and creating digital artefacts in a playful manner. The findings from the school data suggested an emerging theoretical framework for play for the engagement of children with their local heritage and place. The same programme was planned for the summer museum intervention which would confirm or disconfirm this emerging finding.

5.2.2.2 Positive affect



Figure 5-16 DC1 S1.1 Theme Positive Affect

The findings indicate that positive feelings contributed to the overall engagement of children with their local cultural heritage. Positive affect and feeling words were related to all aspects of the project experience e.g. fun, liking, loving, enjoying, emojis of happy faces etc. and are collectively themed under ‘Positive Affect’ (Fig. 5.16). In the written reflections positive affect related to learning (both inside and outside the classroom, making and creating stories with technology, namely Minecraft, and working in teams and with friends.

Dominating the children’s reflections from the beginning was the concept of ‘Fun’, often used with another positive word or emoji:

*“I feel happy and fun!” (week nine)*

132 out of the 134 children’s reflections display evidence of high levels of positive feelings and fun within this exploratory pilot. *Fun* itself related to twenty one percent of the UOMs in the coding process. *Fun* was especially related to the overall project experience, playing Minecraft and to class time e.g. (“*Today in class was very fun because...*”). Although there were challenges, *Positive Affect* was within every experience in the ten-week project e.g. learning outside the classroom, being with friends and the DST process.

5.2.2.3 Learning

The findings indicate that the project was a positive learning experience albeit with tensions in groups and challenges. In the written reflections *Learning* related to curiosity, learning outside and inside the

classroom, being intrinsically motivated to learn, realising aspects of the learning experience challenging, but necessary, and enjoying and overcoming these challenges:

*“Medieval Galway. Today we learned that our country had all different types of clothes, food and leaders. I never thought I would like history but the way we are learning it it feels like I am going to learn a lot and fast” (week two)*

#### 5.2.2.4 Building and creating

The theme of *Building and Creating* reflects the impact of building and creating stories on iPads, and using the game Minecraft on the overall learning experience of children with their local heritage. In the written reflections *Building and Creating* related to children constructing their stories with others, making connections to the city’s medieval features as they were building, and to the challenges associated with using technologies in the classroom. Children were interested in technology for its own sake and for learning:

*“I feel like good doing history on iPads and is good learning more about what happened and I really like it” (week nine)*

*Yes, it was good using technology because it made the project more interesting (Post questionnaire)*

The game Minecraft was also associated with technology. Although the game Minecraft was new to some children, and familiar to many others, the game is a novelty in the classroom, with one child expressing *‘Minecraft is cool and unreal’ (week four)*. This constructionist app supported children in writing stories, in thinking, using their imaginations and creating digital artefacts. Positive feelings were associated with interpreting, building and creating their selected areas of the old medieval town and especially when working with others. Class time was fun. Next to the category *Fun*, the category *Minecraft* formed twenty per cent of the overall UOMs. Positive affect accounted for 70% of the sub-categories (*Building, Story, Fun*) under *Minecraft*. Fun and Minecraft were very much intertwined. The joy of being able to playing Minecraft in the context of a school classroom, building their stories and have fun in the process was evidence of children directly engaging with their local cultural and built heritage. However, when asked in the Again-Again table (Table 5.2) would they *Use Minecraft for History Class* fourteen children said YES whereas in a separate statement sixteen children said they would *Play Minecraft again*. Therefore there are two children who like playing Minecraft but not for history class. Eighteen of the twenty children said they would like to *Use Technology (example iPads, tablets) for History Class* but four children would not want the technology to be Minecraft. There were issues with sharing iPads, and keeping control of game features within Minecraft as well as ensuring

fairness for children and everyone getting their turn. These challenges as well as team issues may have affected children’s ratings. When asked their opinion in the pre and post questionnaire on *I like working in teams*, seventeen children answered YES before the intervention and twelve children answered YES at the end, triangulating with the written data on challenges with the team groupings. On the other hand looking at the Again-Again table (Table 5.2) the twenty children had the option to say YES, MAYBE or NO when asked if they would like to do certain activities again. If the YES and MAYBE results were added together, then all twenty children may like to use technology, iPads and Minecraft for History class. No child said NO to using technology, iPads or Minecraft for History class. From either perspective, children liked using technology, and no one was unhappy with its use. Technology proved an engaging tool for supporting children’s learning and engagement with heritage.

Table 5-2 DC1 S1.1 Again-Again Table - YES, MAYBE and NO

<b>Again-Again Table S1.1</b>	<b>YES</b>	<b>MAYBE</b>	<b>YES &amp; MAYBE</b>	<b>NO</b>	<b>NO &amp; MAYBE</b>
<i>Use Minecraft for History Class</i>	14	6	20	0	6
<i>Play Minecraft</i>	16	4	20	0	4
<i>Use Technology (example iPads, tablets) for History Class</i>	18	2	20	0	2
<i>Go Outside and visit sites</i>	15	4	19	1	5
<i>Work together on teams</i>	14	4	18	2	6
<i>Write a Script</i>	4	12	16	3	15
<i>Search for information on your project</i>	9	6	15	5	11
<i>Record a script</i>	14	1	15	5	6

Flow was evident in the latter stages of the DST process when scripting collaboratively. Once the main characters for the movie were named as ‘Olyver and Agnes’, suddenly there was collaborative flow. Flow was also present when children were playing Minecraft and creating their pieces. On week nine children were excited as they were getting Easter holidays. One child was so engrossed in finishing a Minecraft piece he did not notice happenings around him:

*“I then gave them a few bags of mini Easter eggs and had good fun with some chocolate coins which were covered with money notes as in 500 euro and 200 euro covers. They were all excited about getting some ‘money’. At this stage they were all walking around the class...[Child 1] did get it done [finishing the Long Walk Minecraft piece] which was pretty amazing from him. In fact he missed all the chocolates as he said to me when I was collecting the reflections “are there any chocolates” but they had been eaten by the others while he was working. He hadn’t even noticed and they would have all been standing up around him chatting in groups so he was obviously in a state of flow” (researchers reflections week nine)*

There was evidence of boredom, dis-engagement and re-engagement while using technology:

*“My oppinon on pro – I think this project is fun because we got to use iPads and we asked questions on Todays Meet and I found that funny. But it is also boring because we talked a lot and didn’t have much time on Minecraft but I hope next week will be better” (week two)*

*“I thought it was fun yesterday [emoji happy face] I love how we got into groups and work together. But I really wish that we can pick our own group because some people might not want to be in a group people pick for them, some people might not get involved in the group. They should get to make their own decision. It was really fun!! I love to build stuff! [emoji happy face] I like when we get to make buildings on Minecraft. It’s a game people usually play. Thanks Sally [emoji happy face]. I’m looking forward to it” (week two)*

#### 5.2.2.5 Fun sorters and again-again table findings

In ranking their favourite activities in the Fun Sorter children’s top four activities included *Building with Minecraft* (N=8), *Working with teams* (N=5), *Recording script* (N=4) and *Visiting the sites in Galway* (N=3) on tour of city sites. When children’s top two activities were taken into account it was the same four activities that emerged as favourites albeit in a different order (Table 5.3). All these activities scored high on the *Positive Affect* factor, *Building with Minecraft* strongly related to Fun (70% in code ‘Minecraft’), *Working with teams* (62% positive affect in code ‘Peers’), *Recording script* (59% positive affect in code ‘Story’) and *Visiting the sites in Galway* (93% positive affect in code ‘Physicality’).

Table 5-3 DC1 S1.1 Ranking of Fun Sorter Activities

Ranking of Activities	rank	Per cent	Number One Activity	Number One and Two Activities (Combined)	Per cent
School 1 (n=20/22)	1	8/20 40%	Building with Minecraft	Building with Minecraft	12/20
	2	5/20 25%	Working with Teams	Visiting the sites in Galway	10/20
	3	4/20 20%	Recording Script	Working with Teams	9/20
	4	3/20 15%	Visiting the sites in Galway	Recording Script	7/20
				36 out of 40 children have either 1 <sup>st</sup> or 2 <sup>nd</sup> preferences for above 4 activities	

Engagement through learningful play, interactions with each other, with technology and with the subject matter of cultural heritage/history, both inside and outside the classroom were evident from the findings. When asked in the *Again-Again* table (would you do this activity again?) the data showed that *Using technology (example iPads, tablets) for History class* (N=18), *Play Minecraft* (N=16), *Go outside school and visit sites* (N=15) and *Work together on teams* (N=14) were the highest YES ranked activities children would do again (Table 5.2). Although *Writing a script* (N=4) or *Researching*

information for your project (N=9) received a low number of children’s ranked preferences as well as both receiving a high number of NO votes, children were aware of the group goal, that of creating their final video together:

“I noticed that the script is going to be a bit hard because we have to come up with what the characters say than we have to write it out. But it is worth it because when we are done it’s going to be excellent, well hopefully!!” (week four)

#### 5.2.2.6 Questionnaire findings

When asked opinions in the pre and post questionnaire whether *History is more interesting when using computers* and *Technology makes local history interesting* thirteen children out of nineteen children (N=13, 68%) agreed at the beginning to both statements. However, although *History is more interesting when using computers* increased post intervention to fifteen children (N=15, 79%), *Technology makes local history interesting* decreased to ten children (N=10, 53%).

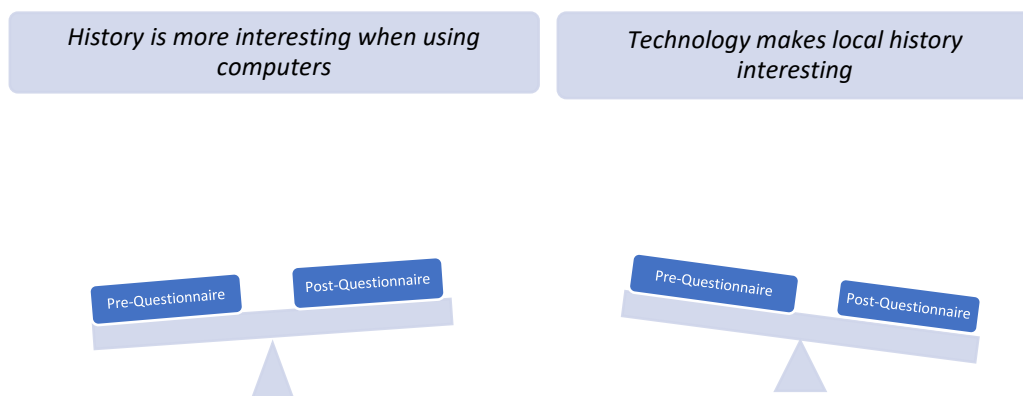


Figure 5-17 DC1 S1.1 Questionnaire Finding - Role of Technology Learning History

The first statement indicates an increased interest in history when using computers. However the second statement indicates technology did not increase interest in local history. Although these two statements point to positive engagement with technology and history with the majority of children agreeing to both statements (53%), it is unclear from these questionnaire statements whether technology enhanced engagement with history and subsequently heritage (Fig. 5.17).

When asked at the beginning of the intervention if they found history boring (*History is boring*), six of 19 children (32%) agreed, at the end two children (11%) agreed. The findings indicate that history became less boring after the intervention by 21% (N=4). Children realised they had learned in the intervention, in the pre-questionnaire the statement *I know the history of my area well*, seven children

“I am amazed by the history of our people. we found out what they wore who they traded with” (week two)



agreed (37%) but after the intervention only 3 children (16%) agreed. The findings indicate that children realised they did not know as much about their locality as they thought they did:

*History class is usually fun* was agreed by twelve of 19 children (63%) prior to the project, but after the project this number dropped to six children (32%). This could be interpreted in two ways, firstly normal school history class is fun but not the intervention history class. Secondly, after the experience of the intervention history class normal history class is not considered as much fun as children thought. Similarly with the questionnaire statement *I like when it is time for History*, pre-intervention 12 children said YES, but at the end only 7 out of the 19 children agreed. This can be interpreted in two ways, firstly the intervention itself decreased their positive feelings for history class or secondly, as they now experienced history class in a different format they may not have quite as much positive feelings to their normal school history class. The written data points to the high levels of fun and positive affect in the classroom with the subject matter of history. *Class time* had the highest amount of codes under the category *FUN*. Therefore I believe both these particular questionnaire statements (*History class is usually fun*, *I like when it is time for History*) point to a positive shift towards engagement with learning history.

### 5.2.3 Summary of findings

The findings indicate that the project was a positive learning experience which contributed to the overall engagement of children with their local cultural heritage. Learningful play was the overarching theme with three sub themes of *Positive Affect*, *Learning* and *Building and Creating*. Positive affect was related to learning both in class and on the field trip, interpreting, building and creating areas of the old medieval town with the sandbox game Minecraft, and working in teams and with friends. Technology proved an engaging tool for supporting children's learning and engagement with heritage. The constructionist tool of the iPad supported children in writing stories, in thinking, using their imaginations and creating digital artefacts. From the questionnaire data it is unclear whether technology enhanced engagement with history and subsequently heritage. The questionnaire shows a positive shift in engagement with history learning, history became less boring. The intervention was not without its challenges: story-writing, group work and technological issues. The intertwining of technology, learning and play (learningful play) was evident in what children would like to do again. Learning history outside school and in the classroom through technology, creating and constructing digital artefacts, using iPads, and interacting socially with peers contributed to an emerging playful learning theory.

### 5.2.4 Discussion

The following discussion section is framed by the *TEChE (Technology-enhanced Cultural Heritage Education)* framework detailed in chapter four. The five lenses of engagement, developed from the literature, of materiality, digital augmentation, playful learning, sociality, and engagement informed the development of the *TEChE* model.

#### 5.2.4.1 Materiality

Integral to this design is that children get an opportunity to go outside, visit local heritage sites and explore their place. The physical tour of the archaeological sites and monuments proved a very positive experience for the children. It was listed as their top-two activities alongside '*Building with Minecraft*'. Only one person said they would not like to do visit sites again. Throughout the experiential process, physical interactions with heritage enabled children build on previous heritage understandings, and to make connections when creating their digital stories in later weeks. They were given freedom to interpret archaeological and historical information in whatever way they and their teammates decided. Using their imaginations to compose a story, physically visiting and seeing archaeological sites helped children imagine and visualise places and re-create these places in their digital artefacts. Positive feelings were attributed to history in the overall data. It is evident that children learned from the physical interactions with local heritage, and the findings suggest an increased interest in history and heritage. Positive place-making and heritage interactions contribute to a child's wellbeing and findings infer children were happy and content as they interacted with heritage. Whereas the combination of technology mediating history, and working with teams supported this enhanced interest, the interaction with the tangible, the material is vital in any pedagogic model for heritage engagement.

#### 5.2.4.2 Digital augmentation

Technology proved an engaging tool for supporting children's learning and engagement. Technology mediated history; children made meaning of history when playing *Minecraft* ("*We got to play on minecraft and we created history*"). In the process they constructed new knowledge structures (Papert and Harel 1991). After the intervention history became 'less boring' and was enjoyable because of a number of factors, including the novel use of the game *Minecraft* for DST in the classroom. Research has shown how technology is increasingly becoming part of the learning process (Selwyn 2016). Telling stories about a place connects us to place, and how children represent experiences shows what they learnt and their processes of meaning making (Wattchow 2013). Therefore the importance of including technologies children are already using in their everyday lives, ones they like and engage with are crucial in creating new ways of learning and representations of learning. Children in this

intervention were constructing their own interpretations of their local heritage. They were actively involved, a characteristic of engagement (O'Brien and Toms 2008) therefore their artefacts were meaningful. It is precisely this meaning that affords a deep engagement with a subject. The effectiveness of using Minecraft as a learning tool can be evidenced when children were asked would they do certain activities again in the Again-Again table. The only activities that zero children chose NO to were *Use Technology for History Class*, *Use Minecraft for History Class* and *Play Minecraft* (Table 5.2). In other words all children reacted positively to these statements by either choosing YES or MAYBE.

#### 5.2.4.3 Engagement

Engagement through learningful play, interactions with each other, with technology and with the subject matter of cultural heritage/history, both inside and outside the classroom were evident from the findings. Engagement factors such as challenge, positive affect, attention, variety/novelty, interactivity, and perceived user control (O'Brien and Toms 2008) were evident in the data. Flow and intrinsic motivation are evidenced in the data. The school environment however allowed little opportunities for flow experiences, as children were sharing iPads and sharing the building and creating of their city sections. However, I observed flow prior to children presenting their Minecraft worlds to the class; children were fully absorbed in the making process.

Positive Affect is core to engagement, without a child enjoying himself/herself there would be little engagement. As children engaged with the different heritage-based activities, their positive affect remained high. This intervention was carried out in an exploratory sense, as a pilot. It could not have been envisaged at the outset that fun would be a prominent design characteristic. Fun cannot be prescribed, it cannot be used as a pretext to teach. It is present when learning conditions are right within a playful environment (Ackermann 2015). Although fun can often be deemed silly or associated with 'messing' and being silly (Sharp and Thomas 2019), children equate fun with high levels of enjoyment while learning. One child summed it up:

*Fun doesn't necessarily mean "messing". To me "fun" means enjoying the objective of what you are trying to do"*

132 out of the 134 children's reflections display evidence of high levels of positive feelings and fun within this exploratory pilot. *Fun* itself related to 21% of the UOMs in the coding process. *Fun* was especially related to the overall project experience, playing Minecraft and to class time e.g. ("*Today in class was very fun because...*"). Although there were challenges, *Positive Affect* was within every experience in the ten-week project e.g. learning outside the classroom, being with friends and the DST process. The overall design aim is for the heritage learning experience to be engaging. Within an

overall learning experience there are periods where children will naturally dis-engage and then re-engage (O'Brien and Toms, 2008). There were some design activities rated low in children's rankings of their most enjoyable activities such as researching information for stories, or scriptwriting that can cause dis-engagement. Additionally, Wi-Fi and technical issues can be frustrating and take away from an engaging learning experience. However, the overall experience was positive, engagement was present, which the literature points to as increasing learning with the subject matter (Brand and Kinash 2013, Short 2012, Steinbeiß 2017). As found in research by Stocklmayer and Gilbert (2002) on engaging children with science, the experience is everything and engagement is the key.

#### 5.2.4.4 Sociality

**What is Fun?**

Fun

doesn't necessarily mean "messing",  
"fun" means enjoying the objective  
of what you are trying to do.

it was fun because  
I was with my friends  
record together  
laugh together  
team work,  
enjoy  
being  
with your friends,  
get in to some different and new.

Learning is fun  
(when you have people to help)  
I enjoy the subject more,  
It is interesting  
enjoying what your learning.

Minecraft is fun,  
we created history  
building castles, walls  
anything you want.

I have fun with work with technology.

Figure 5-18 DC1 S1.1 Free Verse Poetry - children's reflections – 'What is fun?'

Positive social interaction is important to this design model. Alongside technology, social interaction is a vital cog in the constructionist wheel. From Vygotsky's (1978) zone of proximal development we know children learn best with and from each other. However, children must get along together. Equally important to cognitive aspects of learning is the affective engagement of learning, where social interaction plays an important role (Papert and Harel 1991). The teacher chose the team groupings which to some children was not welcome. Children's data reflected the challenges with peers. However, alongside 'Building with Minecraft', and 'Visiting the Sites in Galway', 'Working with Teams' was listed in the top three favourite activities by the children. They enjoyed being in their groups, and making and creating together. As is evident

in the data analysis poem (Fig. 5.18) on 'What is Fun?' the answer is feelings of enjoyment, being with and working with your friends.

#### 5.2.4.5 Playful learning

Many playful learning characteristics include factors evidenced in the findings above such as wonder and delight (Mardell et al. 2016). For example, flow theory is central to engagement; opportunities for

flow present in a playful learning environment. Creativity is fostered within a playful learning environment and children were imagining, creating, playing, reiterating, sharing and reflecting as per Resnick’s Creative Spiral of Learning (Resnick 2007b). Positive affect is core to a playful learning environment, many of the reasons for children’s delight have already been mentioned. The child-centered approach of this intervention added to children’s positive affect and their engagement. A playful learning environment is difficult to achieve within a school as an outside educator or facilitator. Teachers have their own constraints, timetables etc. that may not allow fully for this approach. The messy bottom-up process of ‘making’ that is found in an informal learning setting is the opposite of formal education’s lesson planning and structure (Resnick and Rosenbaum 2013). For that reason it can be discouraged in a classroom (Resnick and Rosenbaum 2013). However, within the messiness and chaos of the playful intervention children were able to overcome challenges they encountered when creating their stories. They negotiated and collaborated with each other building and creating the medieval city in Minecraft. Getting ideas and writing the story was challenging, yet children experienced fun, enjoyment and positive affect, all vital to their overall learning experience. This enjoyable, fun and participatory way of playful learning using technologies, learningful play, can successfully engage children with their local heritage.

#### 5.2.5 Design changes resulting from school S1.1 intervention

The following design changes were implemented for Museum 1.2 (M1.2), which was timetabled for July 2016 (Table 5.4). I amended and added new activities for the museum learning context where objects would be the focus rather than cultural heritage sites. As per DBR methodology I aimed to continue the school design and adapt it as necessary. As the museum intervention was exploratory in nature, I did not know what adaptations may be needed until in-situ. However, challenges such as scriptwriting, team and technical issues noted in the school were marked for improvement in the upcoming museum intervention. Additionally, it was important children could self-choose teammates, move freely around, and that technical issues and challenges might be improved.

*Table 5-4 DC1 Proposed Design Changes from S1.1 to M1.2*

Design changes - S1.1 to M1.2		
Self-choose teams	Provide a cosy learning space	Have extra broadband dongles if challenges with Wi-Fi
Seek voluntary assistance	More exercises to facilitate easier story writing	

### 5.3 Project Layout - Museum

#### *5.3.1 Introduction*

The museum intervention was carried out in the informal local setting of Galway City Museum. Fourteen children volunteered to participate in the research. Although I had tried to recruit a diverse set of participants the children that signed up were all middle-class children (four girls and ten boys) aged between ten and twelve years of age from different city and county primary schools. Children were recruited through school flyers, TEChE website, social media, and university staff magazine advertisements. All due ethical procedures were followed through email and phone correspondence with the children's parents or guardians. All children had prior knowledge of the History curriculum from the Irish National Council for Curriculum and Assessment (NCCA 1999b) as well as experience with Information, Communication Technologies (ICTs). The intervention aimed to complement the 'formal' history pedagogy of the schooling system with object-based learning strategies being incorporated into lesson plans. The museum intervention took place over a four day period in July 2016 (4 hours daily) with a design plan similar to the school intervention. The plan aimed to support children in creating digital artefacts based on narratives they constructed from museum artefacts. These narratives were derived from children's own imagination and information garnered from the objects, exhibitions, information, and displays found in the museum. On the last day, children presented their work publicly to their parents, guardians, family and friends. Quick Response (QR) codes were printed and placed on the museum display cabinets for sharing their stories with the public.

As with the school iPads were available for the children's use. Each team had access to two iPads. However, an initial challenge that arose in transferring the earlier formal setting study into the informal museum setting was the lack of Wi-Fi at the museum itself. Although a Wi-Fi dongle was purchased it wasn't strong enough to support everyone using Minecraft as in the earlier pilot. This called for a revision to determine what tools would best support this intervention. Free low threshold apps (Gilbert 2002) chosen for the DST process included the digital comic app. Comic Life for narrative and images, WeVideo for basic import of video footage and video editing, Animoto for slide shows of images and iMovie for any advanced users. Each iPad also had the Reflector app which mirrored their iPad screens onto the presentation screen from which they presented their works in progress to the other groups. Once they finished their artefacts, I uploaded their digital artefacts (film, slideshows, and digital comics) offsite (because of slow internet access) to the project website.



Figure 5-19 DC1 M1.2 Education room- Galway City Museum - Photo Credit: T. Hall

### 5.3.2 Days one to four

#### **DAY ONE**

Day One served as an introduction to myself, the project and to the other children. A welcoming atmosphere and one of mutual respect was designed for from the beginning. The children were informed about the set-up of the week, and explained they did not have to be there unwillingly- they could leave at any time. I explained to them about the workshop and choices available to make their digital artefact. A sample blog post written for their level with an accompanying image of a museum object (axe) was shown as an example of how they could create stories. I made the decision not to set the room up as in a standard classroom with all tables and chairs. A deliberate attempt was made to create as homely an environment as possible therefore children could choose their own work place, whether that was sitting on a bean bag or on a chair or at a table or around the display cabinets in the museum (Fig. 5.19). I explained to the children they were free to move around the room and the museum for the duration of the camp. Art supplies, markers, paper, etc. were placed around the room for use at any time. Regular breaks were scheduled as well as permission to eat and drink water in the room. The overriding aim was for the child to feel as comfortable in the museum as they do in their own homes. After some icebreaker activities and games which allowed children to get to know each other (Appendix U), children chose their digital avatars for the duration of the project. This facilitated anonymity for the children on the website [www.teche.ie](http://www.teche.ie) where their final digital artefacts were shared and displayed.

In preparation for our object-centered activities, based on the work of Katie Pahl et al. *'Every Object tells a story'* online learning resources (Pahl 2016) we began by discussing what is a museum? I outlined the schedule and topics for the week and discussed how we might gather information. Children formed their own teams with their friends. One child had no prior friendships with others therefore a special effort was made throughout the week to make sure he settled with his team. The teams chose team names and made a team rule they shared with other teams. Children were given a

guided tour by the museum's education officer which enabled them to get a brief rundown of a selected number of artefacts covering the different floors and exhibitions. They were encouraged to ask questions and discuss with their guide as they went along and to note any objects that sparked their curiosity. After the museum tour, activities aimed to explore the different meanings objects hold. The first activity asked '*What object is special to you?*' Children had been asked to bring in an object with them to the workshop but as no-one had brought one, we worked from an object I had brought. We passed it around and discussed meanings that objects might hold for different people. Other object-based activities included handing around an everyday object to hand (a soft plastic water bottle) to discuss the texture, material, features. Building on Pahl et al.'s (2016) idea of using adjectives to engage with an object, children were handed small cards and asked to find adjectives to describe the object, in this case the water bottle. This enabled the children to brainstorm attributes to describe an object that would become useful in the main digital narrative construction task.

### **DAY TWO**

In order to gain more familiarity with the museum objects, a scavenger hunt game was organised to identify objects that the children may wish to use in their stories. Working in their respective teams, children were encouraged to note and capture images of any objects that interested them as they played the game and explored the museum. Three different scavenger hunt sheets were handed to the teams (so that everyone was not on the same hunt (Appendix U). Clues were challenging. This meant the children had to look at the objects and read the labels in the different galleries. In preparation for writing the narrative of their story I encouraged the children to select an object(s) with their group. I gave handouts to the children to help brainstorm uses for their chosen objects and adjectives to describe them. For the next stages of scripting and storyboarding I explained how to plan the design and narrative of their story on a storyboard and provided templates for each team (Fig. 5.20). One team was unsure what to write so we had a discussion regarding possible uses for their selected object(s) and devising the beginnings of a story. By the end of the day, and ahead of the planned schedule, they all had produced an initial draft piece quite quickly with animations, a comic, and drawings of their script characters (Fig. 5.21). Each team presented their ideas and working processes to the other groups at the end of the day. Sharing at this early stage proved valuable, as it influenced the making of team's second digital artefact.



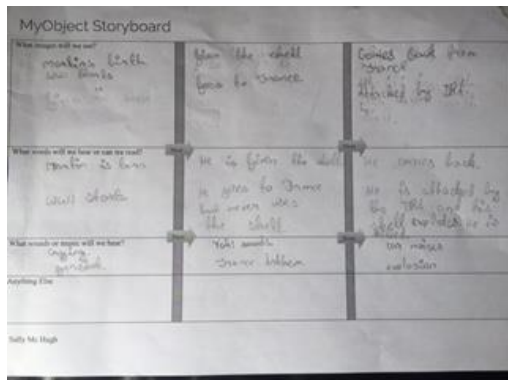


Figure 5-20 DC1 M1.2 Museum –My Object Storyboard

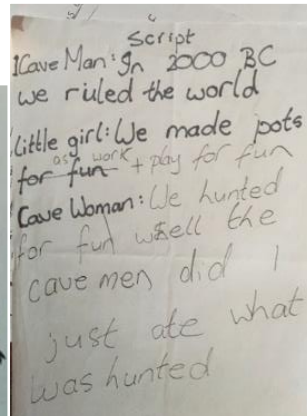


Figure 5-21 DC1 M1.2 'Cave girl' Drawing and Sample Script

### DAY THREE

Day three was scheduled to begin with more object-based activities intended to explore everyday objects, make meaning and construct knowledge but children were restless and eager to continue with their digital stories from previous day. The day became slightly chaotic as children were excited and running in and out of the galleries checking out their chosen objects and labels. They were observed constructing, de-constructing and re-constructing their narratives, using their iPads to take and re-take images and recording and re-recording video (Figure 5.22). Challenges with Wi-Fi meant a team that wished to include audio in their comic had to record a separate audio file and I edited it together for them offsite later. Another team found the WeVideo app inadequate for their needs and transferred to iMovie but this led to overall delays in their final video production. However, by the end of day three each team had a complete digital artefact.



Figure 5-22 DC1 M1.2 L-R, Children Working in Museum Galleries - Photo Credit 1 & 3: T.Hall

## DAY FOUR

Children began the day by filling out the post-questionnaire and daily reflection sheet before continuing to refine their work. Children were under pressure as invited guests were due to arrive for a public sharing of their work in the afternoon. Teams presented their work to another which encouraged three of the teams to begin work on a second artefact. At this stage, they were familiar with the process and had gained sufficient skills. Within this short time they managed to get another artefact made using Comic Life and slide shows with Animoto. Children making videos were under pressure to have completed by 11.30 a.m. to allow time for slow upload to YouTube and website. The day was chaotic and busy so children chose to eat as they worked. QR codes also had to be created, printed and put on display cabinets in museum before guests arrived at 2.00 pm. The children prepared three slides of their work for the public presentation to introduce their working processes/artefacts to the audience, but when it came to actual presentation there were Wi-Fi issues with reflecting onto the screen and iPad battery levels. Instead their final artefact was streamed from my laptop while teams simultaneously narrated their process. One child requested at the last minute



Figure 5-23 DC1 M1.2 Scanning a QR Code in Museum Display Units - Photo Credit: T. Hall

to be general narrator for the public presentation of which he made an excellent job. QR codes had been placed around the museum (Fig. 5.23). Due to time constraints, we hadn't checked the QR codes in situ and parents found that ones in more darkened areas did not work. We were given permission for the QR codes to remain on the display cabinets for two days.

## 5.4 Findings and Discussion

### 5.4.1 Data collection

The museum intervention collected data in different ways:

- Children's daily reflections
- Pre and post questionnaire (included 6/7 (pre/post) open-ended questions and 15/14 (pre/post) VAS statements on previous museum visits opinions on museums, learning in museums, learning with peers, learning with technology, team work, making, heritage and history)

## Chapter Five Design Cycle One

- Parents online survey (included three open-ended questions and one Star Rating Grid on what was positive, what could be improved, feedback and opinions on their children’s learning)
- Fun Toolkit (Again/Again Table and Fun Sorter) (Read and Mac Farlane 2006)
- Researcher reflections

### 5.4.1.1 Coding methods

Coding methods were similar to the school part of this design cycle and drew on Braun & Clark thematic analysis as well as Saldaña’s first and second cycle coding approaches (Table 5.5).

Table 5-5 DC1 M1.2 Coding Methods

Coding Types Used	Descriptive	Holistic	Process	In Vivo	Structural	Values	Attribute
MUSEUM							
Parents survey (sample)	√	√	√	√			
Parents survey- All	√						
Children’s reflections (sample)	√	√	√	√			
Children’s reflections- All			√				

### 1st cycle coding methods

As with the school data, to ensure rigour I coded data using several different types. *Descriptive, holistic, process, in vivo* methods were employed in both the children’s reflections and a sample of the parent’s survey (Figures 5.24, 5.25). Coding was continued with *descriptive* for the parent’s survey and *process* coding for the children’s reflections. Similar to the school intervention an analytic memo and code book was maintained (Appendix V).

Children’s Reflections	Initial (Process) Coding	In Vivo coding
Today was great. Nothing to complain about	Having no complaints	"Today was great"
I that it was very good to learn thanks	feeling good to learn	
I thought that it was very exciting	being very excited	
today was good because we got to go around and pick stuff to put in a movie	selecting stuff for movie	"Today was good"
it was enjoyable	enjoying	
Today was great. I really enjoyed picking our piece and researching them. Rating [smiley face]	enjoying selecting objects Enjoying researching objects	"Today was great" "picking our piece" "Smiley Face"
today was good fun	having good fun today	
It's really fun making videos on history	making history videos is fun	
Best day yet. The time flew. 2.00 before I knew it.	feeling today best day Feeling day go quickly Being engrossed and engaged	"time flew" "Best day yet"
Today was great fun. I really enjoyed using the ipads. It was the best day yet. Day rating [smiley face]	Feeling today was fun Enjoying the ipads Feeling best day yet	"Smiley Face"
I thought Monday was a bit boring but the rest of the camp is very exciting. I enjoy looking for stuff in the museum. And I like the story writing. Overall	Feeling bored at beginning Becoming exciting Enjoying researching and selecting objects Liking the story writing Finding this best camp ever	

Figure 5-24 DC1 M1.2 Example Coding Process - Children’s Reflections- Process & InVivo Coding Methods

## Chapter Five Design Cycle One

Survey Question : "what was Positive"	Descriptive Coding	Holistic coding	Process Coding	Invivo coding
Response Ben learnt about many different historical objects in the Galway Museum and enjoyed making up stories about these items. He had fun whilst learning interesting facts. He thought Sally McHugh the instructor was full of knowledge, and fun and communicated well with the kids .	learnt about objects enjoyed making up stories had fun learning facts happy with instructor good communication with instructor instructor fun instructor good knowledge	Learnt about objects Enjoyed making up stories Fun Instructor had good knowledge Instructor was fun Instructor communicated well	learning about objects enjoying creating stories having fun feeling instructor was fun feeling instructor could talk to kids	"Enjoyed being in the Museum" "enjoyed making up stories" "fun whilst learning" "A different experience"
His confidence interacting with new people and the interest he showed throughout the week in his project and the museum itself.	gaining confidence interacting with new people interest showed throughout week in project Interest showed throughout week in the museum itself	Confidence grew meeting new people Showed interest in project and museum	growing confidence meeting new people being interested finding interest in museum itself	"confidence interacting with new people" "interest he showed"
His engagement with the group project built from the second day. It was clear he was personally committed, excited and proud about the piece they were creating.	group engagement from 2nd day personally committed displaying excitement displaying pride about digital artefact created	Growing engagement Child committed himself Child was Excited Child proud of piece being created	engaging from Day 2 Feeling excited feeling pride at artefacts created	"engagement from the group project built form the second day" "clear he was personally committed, excited and proud" "excited and proud about the piece they were creating"

Figure 5-25 DC1 M1.2 Parents Survey 1st Cycle Coding

### 2<sup>nd</sup> cycle coding methods

Similar to the school intervention above, focused coding was carried out as 2<sup>nd</sup> cycle methods. I conceptualised the final categories in a visual concept map, noting the relationships in order to gain deeper insights into analysis of themes (Fig. 5.26).

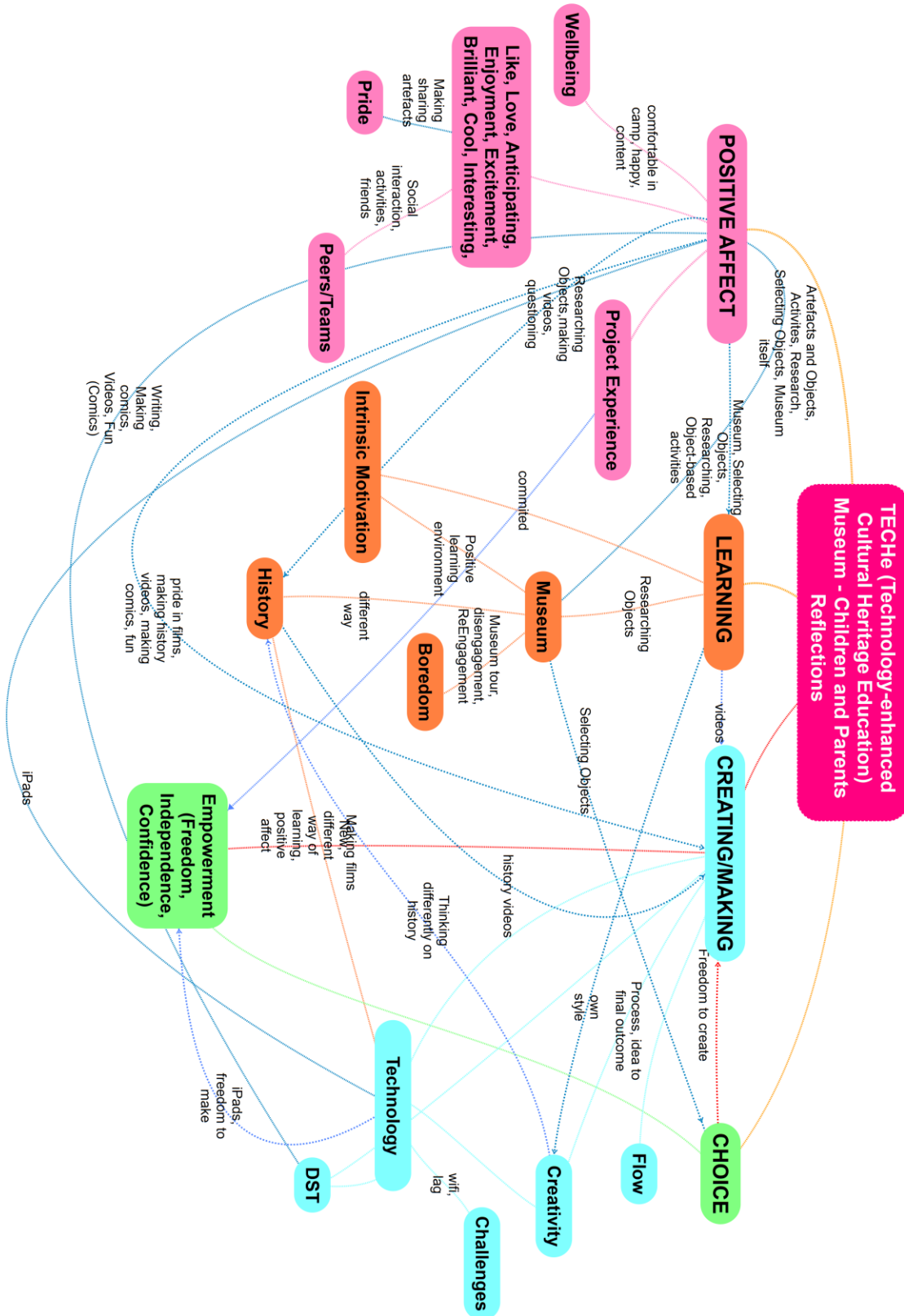


Figure 5-26 DC1 M1.2 Concept Map

## 5.4.2 Themes



Figure 5-27 DC1 M1.2 Children's Reflections and Parent's Survey Themes

The findings indicate the learning experience was highly positive. Parents were highly satisfied and appreciative of their children's participation in the workshop. A positive child-centered creative learning environment was identified from parent's responses as was from children's data. Overall the overarching theme is learningful play, the combination of learning and technology in a playful manner (Fig. 5.27). The main theme can be broken down to the following sub themes:

#### 5.4.2.1 Positive affect

Categories of *Positive Affect*, formed this theme. Children enjoyed the overall experience and had fun. The engagement of children was directly related to their affective enjoyment of the experience. The overall positive experience included contentment and positivity. Well-being, being satisfied, looking forward to the next day, "*having no complaints*", emoticons such as happy and smiley faces all displayed evidence of contentment and reasons why the children were comfortable attending and glad to be present. Although boredom was an initial category in the data, it was found references to 'boring' were always included in an overall positive reflection e.g. "*Enjoyed day. Part of tour boring*". Examples of children's data for all themes are listed in Appendix W.

#### 5.4.2.2 Learning

The findings point to children learning from and with each other. Parents reflected on the effectiveness of team learning, with one parent of an Autistic child pointing, much to her surprise, how her child enjoyed group learning. However, challenges arose in learning with others, in terms of



negotiating group work. Children found the museum learning experience different from their familiar way of learning in school. It was enjoyable and fun, and offered more in ways of learning history:

*“you can learn history in school but not as much in musems. Musems have more to offer in my opinion” (children’s questionnaire)*

Technology supported the learning of digital skills as well as history in the museum:

*“the opportunity to combine his interest in history with learning new tech skills. He really enjoyed being in the museum, it was a different experience and a balance to the sports camps he will do” (Parent survey)*

By using the artefacts to learn children had opportunities for thinking, understanding and research:

*“in school they look at the factual way but here you can understand it and think” (children’s questionnaire)*

#### 5.4.2.3 Creating and making

Children enjoyed technology and making and creating their digital artefacts. Children were observed being immersed and in a state of flow many times, mixing with each other and moving freely around, and out in the galleries researching their objects:

*“I had fun whith [with] the comics but I forgot about the lunch and I worked through brake [break]” (child reflection)*

#### 5.4.2.4 Choice

The theme choice related to children’s physical freedom within the museum. Children were introduced to the museum and objects initially on a general guided tour and through focused activities. Children were then given complete freedom to spend time in the galleries. Both children and parents appreciated the freedom to choose their own objects, their own interpretations and the content and direction of their videos. The self-directed learning was noted positively by one parent in *“the sense of independence it created!” (Parent survey)’*

#### 5.4.2.5 Fun toolkit – fun sorter and again-again tables

	Yes	Maybe	No
Learn with objects			
Search for information on your project			
Work together on teams			
Use video to show what I learn			
Use comics to write a story			
Use Technology (example I pads, tablets) for learning in a museum			
Write a script			
Make a digital story			

Images have been removed due to Copyright restrictions									
<b>Most Enjoyed</b>	Learning about the meaning of objects	Looking for and Finding information for my digital piece	Thinking of and writing the story	Working with teams	Making a Comic	Using video	Using ipads	Taking images	Learning in a museum
	<b>Number these 1 to 9.</b>								

Figure 5-28 DC1 M1.2 Fun Toolkit Museum–L-R Again-Again Table, Fun Sorter

*Learning about the meaning of objects* was in the top three favourite activities reported by the children in the *Fun Sorter* (Table 5.6) as was “*Search for information on your project*” (N=14) in the *Again-Again* table (Table 5.7), possibly because children had the freedom to move around and research objects of their choice. *Using iPads* was the top ranked activity in the *Fun Sorter* which triangulated with the *Again-Again* Table where 13 children would like (plus one child ‘maybe’) to use technology again. Four children reported that *Working with teams* was their most favourite activity, from the *Fun Sorter* ranking toolkit. The *Again-Again* responses further corroborates this finding. On asking whether children would work in a team again, the majority reported that they would (N=12), with one maybe (N=1), and one blank response. These findings from the *Fun Toolkit* would indicate that a mixture of physical and digital activities, using technology within a team, physically searching for information in the museum is what children would most do again. Findings confirm the presence of a learningful play environment, one where children learn using technology with friends in a playful and creative manner.

Table 5-6 DC1 M1.2 Ranking of Activities – Fun Sorter

Ranking of Activities	Rank number	Per cent	Number One Activity	Would you do this activity again?	Number One and Two Activities (Combined)	Per cent
Museum (n=14)	1	5/14 36%	Using iPads	Yes 13	Using iPads	8/14 57%
	2	4/14 29%	Working with teams	Yes 12	-Learning about the meaning of objects -Taking images -Working with teams	4/14 29% 4/14 29% 4/14 29%
	3	2/14 14%	Learning about the meaning of objects	Yes 12		

Table 5-7 DC1 M1.2 Again-Again Table

Ranking of Activities	number of children =14	YES	NO	MAYBE	Blank
Search for information on your project		14			
Use Technology (example iPads, tablets) for learning in a museum		13		1	
Learn with Objects		12		2	
Work together on teams		12		1	1
Use video to show what I learn		12		2	
Use comics to write a story		12	1	1	
Make a digital story		12		2	
Write a script		6		8	

Whereas ‘*Learning about the meaning of objects*’ was in the top three ranked activities in the *Fun Sorter* (Table 5.6). However three children ranked ‘*Learning in a museum*’ as their least favourite activity in the *Fun Sorter* which indicates the children may not have been consciously aware they were



learning. Within parents' responses to the learning experience, terms of 'learning', 'work' and 'history' emerged whereas, in contrast, children mentioned 'fun' (visual word cloud (Fig. 5.29).



Figure 5-29 DC1 M1.2 Word Cloud L-R Parent's Survey and Children's Reflections

#### 5.4.2.6 Questionnaire findings

When asked in the pre and post questionnaire if they enjoyed history, pre-intervention 14 children responded as YES (N=11), NO (N=2) and NOT SURE (N= 1). Although there was a slight change in the post-questionnaire to YES (N=10), NOT SURE (N=3) and one blank response, the data shows there was a positive attitude on the enjoyment and non-boredom of history.

Children's pre and post-questionnaire data showed they believe working in a team helps with learning and acknowledged they learned from other children during the week, one child reportedly did not like working in teams, following his/her participation in the camp, based on the VAS scale responses.

When asked in the pre-questionnaire what they might learn during the camp, technology references included 'iPads' and "about technology" (N=4). The number of 'technology' references reduced in the post questionnaire (N=2) and changed to learning about story making through using technology:

"you can make stories on iPads' (children's questionnaire)  
 "I learned how to make a comic on an iPad" (children's questionnaire)

When asked in the questionnaire did computers facilitate an increase in interest in heritage there was a mixed response. At the beginning seven (7/14) children said YES which remained the same in the post-questionnaire. However, another six children who were unsure in the beginning changed

to four being unsure and two children said NO in the post-questionnaire. These responses indicate that computers may not increase interest in heritage. A similar VAS statement phrased in a different way (*Technology make a museum visit more interesting*) indicated that technology does make a museum visit more interesting. At the beginning nine children (9/14) agreed but eleven children (11/13) agreed with the statement by the end of the project. Four children were unsure at the beginning of the project but had reduced to two by the end. These findings indicate that the museum visit itself, the experience in the museum was made more interesting by technology but that the heritage engagement was not enhanced by technology.

All fourteen children completed parts A and B of the pre-questionnaire and part A of the post-questionnaire, but only thirteen completed the Likert scale (part B) of the post-questionnaire. Children at times left statements or questions blank which accounts for differences in numbering of answers. The findings indicate that the museum experience was positive for the children. Initially four children had never been in a museum before but when asked in the post-questionnaires if they would visit a museum again, the answer was yes (N=14). Three children were apprehensive about coming to 'camp' but when asked in the post-questionnaire did they enjoy the workshop all responded positively (N=14). From the questionnaire data, learning about local history through the objects, making movies with those object with friends (old and new), the overall positive experience and the freedom to move around were what children enjoyed the most about their experience.

Although the children enjoyed 'making things' and became more open to exploring history and heritage in different ways, there was a slight negative change to learning new technologies, according to the questionnaire data (N=1). This has been observed by Read's (2012) study where at the beginning of a learning experience, expectations of technology can be quite high and children will rate it very highly. The attitude change detected by this study's questionnaire may be related to switching apps midway through the intervention and/or limitations with our Wi-Fi.

### 5.4.3 Summary of the Findings

Children enjoyed the overall learning experience and had fun. Children's enjoyment related to learning about local history through the objects, making movies with friends, the overall positive learning experiences and having freedom. Positive affect led to engagement. Although boredom was present, it is a natural form of dis-engagement and re-engagement (O'Brien & Toms 2008). The museum experience was different way of learning for the children, being in-situ allowed them interact at a deeper level with history and opportunities for critical thinking and reflection. Technology mediated the learning in the museum, although there were minor technological issues. Children liked learning about objects, researching and interpreting objects of their choice. Children had physical and

intellectual freedom within the confines of the museum learning experience. They had autonomy and agency in their own learning. Freedom, choice and voice afforded children self-direction and independence in their learning. Meanings of importance to the children were incorporated into their learning processes. Children showed evidence of intrinsic motivation; doable challenges (Csikszentmihalyi 2019) together with positive affect provided opportunities for flow experiences, as they 'forgot lunch' and worked through break times. To the children, they were having fun in the museum; being out of a formal school environment, which they associate with learning, they all did not realise they were learning informally. They enjoyed working with teams and learning through technology. Children learnt from their peers, although there were challenges. There was a positive attitude on the enjoyment and non-boredom of history, before and after the workshop. Children indicated computers may not increase interest in heritage. The museum visit, their positive experience is made more interesting by technology but heritage engagement for these children was not enhanced by technology. Museum engagement increased rather than heritage engagement.

### 5.4.4 Discussion

Similar to the school intervention this discussion section is framed by the *TEChE* framework detailed in chapter three (theoretical framework).

#### 5.4.4.1 Materiality

Seeing, finding and researching objects of their choice, in situ and having the freedom to select those of interest and/or of relevance to themselves for creating stories are different ways of learning history. In the creation of children's stories, the teams selected objects together. There were no rules about what could be used or not, or whether an object was used in its correct context or not. The aim was for the child to engage their imaginations and be creative, to allow open interpretation and similar to Warpas' study, children were not obliged to conform to historical facts (Warpas 2014). Engagement was evidenced when one particular team of four chose an object each and combined them in novel interpretations for their stories showing evidence of creative insights. Children presented their work from their iPads to the projector screen each afternoon to the other teams. Learning from each other's ideas, scripting, and skills was all observed. These sessions both inspired and provided ideas for other teams for their second artefacts.

#### 5.4.4.2 Digital augmentation

Technologies are breaking through existing forms of learning (Falk and Dierking 2013) and in the museum, this novel way of learning through using technology was enjoyable and different for the children. It has been found that the playful, creative use of technology supports playful interaction

with museum exhibits (Yiannoutsoua et al. 2009) which was applicable to objects in this intervention. In this case where children had complete freedom using technology in the galleries, interactions with and learning about the meaning of objects was highly rated as an enjoyable activity. As *Using iPads* was children's top ranked activity the evidence points to the use of digital augmenting object-based and subsequently heritage learning. Children who showed evidence of learning through the use of technology show how the technocentric perspective may have moved on. Papert in the 1980s had argued that conversations about learning and teaching with technology were technocentric (Papert 1987), they were about the technology itself. In 2014 learners were still centered on the technology itself (Brennan 2014) However, here children have moved from the technocentric to conversations about supporting learning through technology. When children were asked in the post questionnaire what they enjoyed about the camp there was no mention of technology. Responses were broken down to *Sociality* (N=3), *Overall Experience* (N=3), *Freedom/Play* (N=3), *Learning* (N=2), *'Looking' at Objects* (N=2), and *Storytelling* (N=1). Parent's survey responses did mention a positive use of technology for learning and making films. Technology began to morph from the novelty and excitement of use to an invisible layer in the learning process.

#### 5.4.4.3 Engagement

Engagement is key to any museum experience (Stocklmayer and Gilbert 2002). Objects have become

##### **Not Sitting in a Seat**

You can make history into a story  
 You can see the stuff your talking about,  
 Not stuck at a desk all day  
 Each object had a sto-rey,  
 Move around / free -ly  
 The Clada was once its own ci-ty.

You get to really see the ar-te-facts  
 Engages me in visual facts,  
 I like when he showed us the sword  
 Monday was a bit bor[ed],  
 But the rest was very exciting  
 And I like the story writing.

Apart from the heat,  
 Not sitting in a seat,

All day  
 Play-  
 ing and having fun.

The time flew,  
 Two\*  
 Before I knew.

\*2p.m.

sites of experience in museums (Hein 2014) and evidence shows how children wanted to learn about, and search in the museum for, objects for their stories. It is central to children's learning experiences they are allowed run and walk freely around a museum (Hackett 2016). The physical and intellectual freedom in children's interactions with objects allowed for autonomy, independence and self-direction in children's learning. Freedom to interpret as they wished, freedom to choose digital applications and freedom to move around fostered positive affect which allowed for the development of children's intrinsic motivation. Together with doable challenges, this cognitive-affective state of being (Csikszentmihalyi 2019) fostered flow experiences, one of which is evidenced through the poetic representation of children's verbatim data (Fig. 5.30). Additionally, the combination of intrinsic

Figure 5-30 DC1 M1.2 Free Verse poem - Children's Reflections - 'Not Sitting in a Seat'

motivation and positive affect is key to high creativity

(Amabile 1990) and creative efforts (Csikszentmihalyi 1990a) which was evident in the children's artefacts (Appendix X).

#### *5.4.4.4 Sociality*

Being and working with friends was a highly ranked enjoyable activity by the children. Creating their stories using technology in a playful manner engaged the children. Having the choice and freedom to go around the museum, actively participate with their friends afforded deep engagement (O'Brien and Toms 2008). When children interact freely with their peers in the free-choice learning environment of a museum their ZPD is being facilitated (Wong and Piscitelli 2018).

#### *5.4.4.5 Playful learning*

With playful learning, play and learning are happening together. However, Letourneau and Sobel (2020) found children have separate concepts of learning and playing. As is evident in the visual cloud analysis of Figure 5.29, parents and children had different perspectives on the museum learning experience. Parents mentioned learning, children believed they were playing and having fun. This can be a disadvantage to children's learning when they do not connect play and learning (Letourneau and Sobel 2020). When children realise play and learning can co-exist they recognise how their playful activities can afford them learning opportunities (Letourneau and Sobel 2020). The museum served as a space for playful learning to flourish. Children's creativity flourished in the museum. The playful space of the museum, the opportunity to go in and out of the galleries, interact with different and exotic objects fostered children's creativity. As per Resnick's Creative Spiral of Learning (2007) the museum provided the space for imagining, creating, playing, sharing, and reflecting. Having the freedom to choose, explore, and discover for themselves enabled children to take an idea through an iterative creative process to a finished digital artefact. As is evident in the data analysis poem earlier (Fig. 5.30) *Not Sitting in a Seat*, having freedom and choice and positive affect, all features of a playful learning environment encourage flow and deep engagement.

### 5.5 Formal versus Informal Learning Environments

Table 5-8 DC1 Summary of Themes

Phase	Number of Participants	Ages	Methodology	Dates	Themes
School	22	10-13	Children’s reflections, pre and post questionnaire, Fun Toolkit Researchers reflections	January to April 2016	Learningful play (Positive Affect, Learning, Building And Creating)
Museum	14	10-12	Children’s reflections, pre and post questionnaire, Fun Toolkit Researchers reflections	9 <sup>th</sup> -12 <sup>th</sup> July 2016	Learningful play (Positive Affect, Learning, Building and Creating, Choice)

The Findings were similar in both interventions with learningful play becoming the main overarching theme (Table 5.8). However, the museum additionally had a theme of *Choice*, features of which were not as prevalent in the school. Both learning contexts aligned to the theories of constructivism and constructionism as outlined earlier. Additionally, this cycle evidenced play theory as a way forward for heritage education. Both school and museum aligned to the engagement lenses of the *TEChE* design framework. The evolving design sensitivities and design changes going forward are detailed later in this chapter.

The museum afforded greater freedom, in terms of self-directed learning and working with peers. Children were happier with teams and groups in the museum rather than the school. As can be

I like working in teams						
SCHOOL			MUSEUM			
Yes	Not Sure	No	Yes	Not S	No	Blank
PRE 90%	PRE 5%	PRE 5%	% PRE 12 (86%)	PRE 1 (7%)	PRE 0	PRE 1 (7%)
17/19 children	1/19 children	1/19 children	of 14			
POST 63%	POST 26%	POST 11%	% POST 11 (84.6%)	POST 0	POST 1 (7.7%)	POST 1 (7.7%)
12/19 children	5/19 children	2/19 children	of 13			
-27%	21%	6%	Change -1	-1	1	0
-5	+4	+1				

Figure 5-31 DC1 Comparison of Team Attitudes

noted in Fig. 5.31 children’s response to a pre and post questionnaire ‘*I like working in teams*’ in the school environment showed a drop to 63% from 90% in their enjoyment working with others. Although still positive with the majority enjoying social interaction, the museum cohort remained steadier and dropped marginally from 86% to 84.6%.

Two statements in the questionnaire produced different results in both learning contexts (Table 5.9). In the school findings the statements concerned are *History is more interesting when using computers* and *Technology makes local history interesting*. The first statement indicates an increased interest in history when using computers. However the second statement indicates technology did not increase interest in local history. In the museum the statements concerned are *Heritage is more interesting when using computers* and *Technology make a museum visit more interesting*. These findings indicate that the museum visit itself, the experience in the museum was made more interesting by technology but that the heritage engagement was not enhanced by technology. It is interesting that the opposite

answers emanated from museum and school. Apart from these findings, both learning contexts had high percentage of children agreeing with these four statements, albeit one statement with a 50% agreement. From the questionnaire data it is overall unclear whether technology enhanced engagement with history and subsequently heritage in the formal school environment. This finding will be explored further in DC2.

Table 5-9 DC1 Questionnaire (2) Comparisons – School and Museum

Questionnaire (2) Comparisons – School and Museum			
Statement	Technology makes local history interesting	History is more interesting when using computers	
School pre-intervention	13 Yes , 4 Maybe, 2 No	13 Yes , Maybe 5, No 1	
School post-intervention* n=19	10 Yes	15 Yes	
Interpretations of Post Questionnaire results* n=19	(a) 10 Yes, 6 Maybe, 3 No Or (b) 10 Yes, 3 Maybe, 6 No	(a) 15 Yes, 2 Maybe, 2 No Or (b) 5 Yes, 2 No, 2 Maybe	
Interpretation	Adding the YES and Maybe for the two possible solutions would give N=17 for preQ and (a) N=16 or (b) N= 13) for the two postQ possibilities. Therefore, I interpret this as a negative change	-	Because the number is 2 for either Maybe or No (postQ), it can be taken that the Maybe reduced from preQ by 3 students, therefore together with the increase in the YES votes I interpret this as a positive change
Statement	Technology make a museum visit more interesting	Heritage is more interesting when using computers	
Museum pre-intervention n=14	9 Yes, 4 Maybe, 0 NO, 1 Blank	7 Yes, 6 Maybe, 0 NO, 1 Blank	
Museum post-intervention n=13	11 Yes, 2 Maybe, 0 NO	+	7 YES, 4 Maybe, 2 NO

\*data not clear from post-questionnaire, therefore I did not use responses as I had concerns with validity (see Methodology chapter)

The findings infer that learning in the museum is related to constructivist learning approaches such as object-based, inquiry-based and child-centered learning. Children found the museum a good place to learn in a different way to school according to the post-questionnaire (N=14). Learning in the museum was found to be fun and the opposite of school. Children recognised their own learning and understanding grow in the museum by seeing and researching real objects and grasping historical concepts. They could explore their personal interests and self-direct their learning rather than traditional educational approaches. Whereas the school intervention took an inquiry-based and child-centered approach, this is not the normal way of learning within formal education. Children's history and heritage learning is curriculum driven and more structured.



Children had more physical freedom in the museum. The space in the museum lent itself to playful learning with children being free to moving around. The School had a fixed set up of space with solid wooden desks and very little space to move around. Whereas the school children had one physical tour of city archaeological sites and monuments, children in the museum had opportunities for constantly connecting with the subject matter. They had choice in selecting and researching chosen objects for their stories therefore authentically expressing themselves and their understandings.

Challenges and tensions arose in both learning environments. The school intervention had time constraints, with only two hours to cover the objectives of the day. When challenges arose such as technical, Wi-Fi or team tensions, these interrupted the flow of the project. In the museum although children were under pressure to finish their artefacts for their public presentation, during the workshop children worked at their own pace.

Feedback from parents and children pointed to positive playful learning environments. Both learning environments were deemed enjoyable and fun, the school leaning more towards fun. Fun in school was highly related to class time and to playing Minecraft. Playing Minecraft in the classroom was a novelty and is not normal practice in the formal school learning environment. Whereas summer camps such as the museum workshop are voluntary for children and are therefore normally aimed to be enjoyable, fun in the classroom was possibly new (in the context of history) for the school children. Children enjoyed using technology with others in both school and museum. Learningful play and learningful interactions were found to enhance children's engagement with heritage in both learning environments.

### 5.6 Playful Learning Indicators across the School and Museum

After DC1 pilot (2016) was carried out I discovered a study by Project Zero, Harvard University on Playful Learning (Mardell et al. 2016). Their playful learning research carried out in schools lists indicators of what playful learning might feel and look like (Table 5.10). These indicators are categorised under three main categories **DELIGHT**, **WONDER** and **CHOICE**. Accordingly, I recoded the children's data from both contexts under the three categories (coding example Table 5.11). Some data were coded under more than one category. Some data intersected under all three categories. I added to the *Pedagogy of Play* Playful learning indicators additional indicators experienced by the children in this thesis (Table 5.10).



## Chapter Five Design Cycle One

Table 5-10 Pedagogy of Play Indicators added to DC1 TEChE pilot project

Pedagogy of Play (Mardell et al 2016) categories and indicators adapted to TEChE pilot					
DELIGHT		CHOICE		WONDER	
FEELS LIKE	LOOKS LIKE	FEELS LIKE	LOOKS LIKE	FEELS LIKE	LOOKS LIKE
Satisfaction	Anticipating	Autonomy	Setting goals	Challenge	Taking risks
Excitement	Hygge	Empowerment	Negotiating	Engagement	Trying
Enjoyment	Joking	Ownership	Being spontaneous	Curiosity	Learning from mistakes
Belonging	Celebrating Focusing attention	Intrinsic Motivation	Purpose Moving around	Novelty	Creating Improvising
Pride	Smiling/Laughing		Having and sharing ideas	Surprise	Exploring
Inspiration	Competing		Choosing collaborators	Fascination	Pretending
	Being silly		Making and changing		Inventing
	Being Altruistic		Challenges		Expressing Excitement
	Achieving/succeeding Singing/humming		Choosing how to long to work/play		Imagining
TEChE additions: Joy, expecting fun, Looking forward, sharing processes, sharing finished digital artefacts		TEChE additions: Positive challenges (hard fun) Joy in Learning (purpose) Passion (purpose) Not sitting in a seat		TEChE additions: Observing closely, focusing attention, flow, amazed by objects, monuments, Making personal connections, connecting with previous knowledge, naming places, positive challenges (hard fun), negative challenges (disengagement), building with Minecraft	

Table 5-11 DC1 School Example (week 10) of Coding Pedagogy of Play, Playful Learning Indicators

DELIGHT	WONDER	CHOICE
<p>"It was very fun! I love to record my voice. It sound really good, we sound like a baby but it's really fun. I hope the movie is going to be fun! + smiley face [ENJOYMENT, PRIDE, SATISFACTION, ANTICIPATING] [EXPRESSING EXCITEMENT]</p> <p>"I really enjoyed recording are voices even though I was really enbrassed by doing in so I had a good. There is nothing to improved on it is perfected." [ENJOYMENT, SATISFACTION] [TAKING RISKS, TRYING, NOVELTY]</p> <p>"I think this project was fun and I really liked playing Minecraft with my friends. I don't think anything needs to be improved" [ENJOYMENT, SATISFACTION] [EXPRESSING EXCITEMENT]</p> <p>"I think this project was fun. I enjoyed when we recorded our voices" + smiley face [ENJOYMENT] [NOVELTY]</p> <p>"Today I thought was very fun. I loved the studio it was very good and I don't know what could be improved because it was all brilliant" [ENJOYMENT, SATISFACTION] [NOVELTY]</p> <p>"I think today was very fun and I really like the studio" [ENJOYMENT] [NOVELTY, EXPRESSING EXCITEMENT]</p> <p>"I think today was fun because we got to record and we got to be in a recording studio [ENJOYMENT][NOVELTY]</p> <p>"I liked the time we got the tables and when we recorded but I think that nothing should be changed" [ENJOYMENT, SATISFACTION] [NOVELTY]</p> <p>"I enjoyed going to the NUIG. I enjoyed speaking in the radio. Nothing had to be improve[ENJOYMENT, SATISFACTION] [NOVELTY]</p> <p>"I really liked this project My favourite part was when we recorded our voices." [ENJOYMENT] [NOVELTY, EXPRESSING EXCITEMENT]</p> <p>"I think this project is great I enjoyed the bulding was the best part" [ENJOYMENT] [CREATING]</p> <p>"I really enjoyed this project. I liked going to the university to record our voices. More minecraft please." [ENJOYMENT] [EXPRESSING EXCITEMENT, NOVELTY, FASCINATION]</p> <p>"I really enjoyed it and today was one of my favourite days. I enjoyed all the teamwork with my group. The team talk could be improved [EXPRESSING EXCITEMENT] [ENJOYMENT, BELONGING] [HAVING AND CHANGING IDEAS, NEGOTIATING, CHALLENGE]</p> <p>"I really liked building the stuff and also I liked recording our voices for the film" [ENJOYMENT] [NOVELTY, EXPRESSING EXCITEMENT]</p> <p>"I really liked doing this project the most favorite part is when we went recording and the part I need to stay away from the microphone." [ENJOYMENT]. [NOVELTY, LEARNING FROM MISTAKES, TRYING, EXPLORING, EXPRESSING EXCITEMENT]</p> <p>"I really enjoyed this project and my favourite part about this project was when we were talking in the microphone" [ENJOYMENT][NOVELTY, EXPRESSING EXCITEMENT]</p> <p>"I really enjoyed this project and I liked building in Minecraft and I also liked recording my voice" [ENJOYMENT] [NOVELTY, CREATING, EXPRESSING EXCITEMENT]</p> <p>"I really enjoyed this project with Sally. The best part of it was the recording studio. I loved working with my friends. I don't think anything could be improved." [ENJOYMENT, BELONGING, SATISFACTION] [NOVELTY]</p>		

In the School and Museum both environments had high indicators of DELIGHT, children’s reflections in the school having 97% and in the museum 95% (Table 5.12). DELIGHT in both contexts included positive affect (fun, enjoyment, excitement), pride, belonging, satisfaction. Under the category of WONDER there was a difference between children in the school (68%) and in the museum (61%). WONDER codes included novelty, curiosity, surprise, fascination in both contexts as well as engagement indicators such as creating, trying, expressing excitement. However the category of CHOICE displayed the largest difference between both contexts, playful indicators totalling 51% in the museum data as opposed to 23% in the school data. Categories (DELIGHT, WONDER, CHOICE) included all together in datum pieces totalled 13% of the children’s school reflections and 34% of the children’s museum reflections (Table 5.12). According to the POP model, when all three categories intersect playful learning is taking place. Although the data from the museum was thinner than the school data, the findings infer that the museum was more conducive to playful learning. The visual diagram (Fig. 5.32) below shows how the museum was more evenly balanced between the three playful learning indicators.

Table 5-12 DC1 Pedagogy of Play Comparison School and Museum

PEDAGOGY OF PLAY Categories	DELIGHT	WONDER	CHOICE	DELIGHT & WONDER & CHOICE
SCHOOL (N=134)	130 (97%)	91 (68%)	31 (23%)	17 (13%)
MUSEUM Children only (N=41) Uncoded N=1	39 (95%)	25 (61%)	21 (51%)	14 (34%)
*MUSEUM (N=37) Parents responses Uncoded N=12 (32%)	24 (65%)	11 (30%)	16 (43%)	7 (19%)
*MUSEUM (N=78) Children and Parents	63 (81%)	36 (46%)	37 (47%)	21 (27%)

\* For the purpose of analysis below I am comparing children’s museum responses only with children’s responses in school

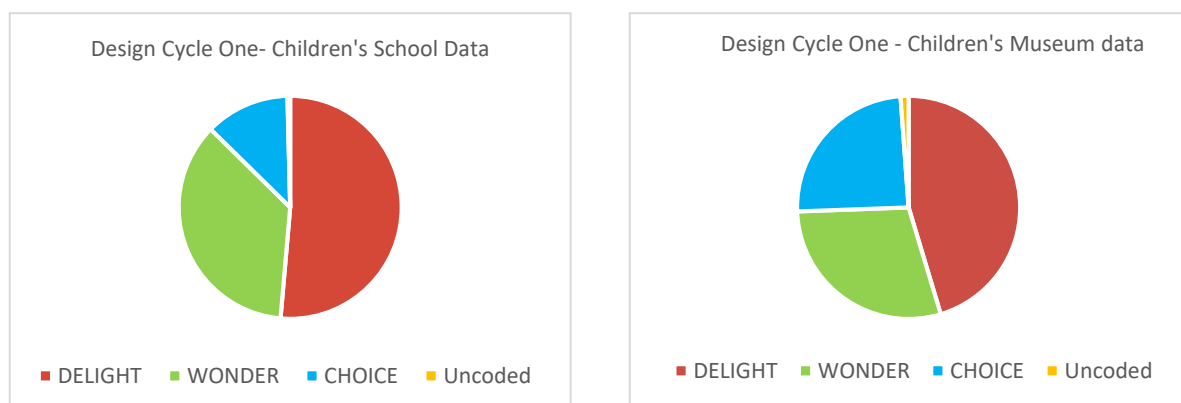


Figure 5-32 DC1 Pedagogy of Play Categories Comparison Museum and School

31 school data codes were coded in the CHOICE category. Some were coded under more than one indicator. *Autonomy* (N=15) and *Intrinsic Motivation* (N= 13) were the highest CHOICE indicators in the school data and to a lesser degree *Ownership* (N=5) and *Empowerment* (N=5). Playful learning was evidenced when children were playing Minecraft in the classroom. They were setting goals, sharing ideas, making, changing and negotiating, and were motivated by a purpose to learn. Additionally, they had an eagerness for Minecraft with freedom to interpret medieval sites and their own groups' storylines. In the Museum the dominant CHOICE indicator was *Autonomy* (N= 25) and to a lesser degree *Empowerment* (N= 8), *Ownership* (N=7) and *Intrinsic Motivation* (N= 6). Playful learning was evidenced by freedom to move around and to choose their collaborators. Additionally, children were able to see what they were learning and researching, choose/re-choose objects, make, change and share ideas, with a purpose of creating their digital stories and team artefacts.

The major CHOICE difference between the Museum and the school came down to *Autonomy* and *Intrinsic Motivation*. *Intrinsic Motivation* in the school context was related to wanting to learn and being interested in learning history, whereas as noted earlier through visual word analysis all children in the museum did not appear to be aware they were learning. *Autonomy* in the museum was related to children's freedom to move around, to choose collaborators and in their selection and re-selection of story content (objects). In general in the school these particular indicators were absent. As a researcher, not having full control of ensuring greater autonomy, ownership, empowerment (indicators of CHOICE) in the school context influenced the absence of certain playful learning indicators. However, these findings provide a focus for changing and improving the design in the next cycle.

### 5.7 Design Changes and Modifications for Design Cycle Two

Children engaged with heritage in the context of play-based approaches in this design cycle. Whereas the museum intervention was almost a 'bull's eye' in relation to the intersection of POP's playful learning indicators, the school intervention lagged behind the museum in terms of *CHOICE* playful learning indicators (Fig. 5.32). Learning experiences in the classroom context are more effective when planned strategically (Blatchford et al. 2003) therefore going forward to the next design cycle changes were deemed necessary to increase the playful learning aspect of the design especially in the school context (Table 5.13). The aim was to augment child-centred learning approaches and especially autonomy for children. With the absence of a teacher or strict focus on curriculum the museum intervention displayed evidence and potential for a more engaging playful heritage learning environment. It became apparent that securing ethical approval for video was vital for future interventions. Video would be critical to capture learningful heritage interactions, often unobserved in this exploratory pilot. Additionally using video may provide evidence whether or not

technology enhances engagement with local heritage. Time constraints in both interventions for the purpose of reflection was noted. Therefore reflection journals for completing at home were planned for the next cycle. Focus groups were planned to capture deeper feedback from children. It was hoped in future school environments children could self-select their own teams and work with friends.

Table 5-13 DC1 Evolving Design Changes DC1 to DC2

Changes planned for DC2	Reasons:
Theory: Play	Main theory emerged from data in exploratory pilot cycle.
Theory: Creative Learning	Resnick's <i>Creative Spiral of Learning</i> , theory of six parts (imagining, creating, playing, reiterating, sharing and reflecting) emerging but missing one element (Reflection) (2007b).
Introduction of reflection journals	To provide evidence for playful and creative learning and foster deeper reflection on the learning experience.
The use of video to observe behaviour and attitudes	To observe how children engage with heritage, and the role of technology in the learning experience To observe playful learning and creative learning theory in action, to note connections with heritage. To determine what are learningful interactions with heritage.
Focus groups (schools)	To obtain deeper observances from children on the learning experience and to note improvements for following interventions.
Greater choice in schools regarding teams	As social interaction proved vital to a positive learning experience with heritage, to discuss with teachers in advance how this could be best done.

## 5.8 Evolving Design Sensitivities

Evolving Design Sensitivities (DS) emanating from the first intervention are detailed in Table 5.14 and an overall view visualised below in Figure 5.33. The nine DS's based on constructivist and constructionist learning principles have been mapped to the theoretical *TEChE* framework and are based on the major themes from the DC1 data that form learningful play: - Learning, Building/creating, Positive Affect and Choice. It was noted improvements needed to be made to the design and these are included as tentative design sensitivities DS 8-9.

The evolving design guidelines list details how the design should proceed into DC2. There should be a concrete experience with place and/or heritage which should be open to children's own creative interpretations, although factual age-related local information should be provided during the process. Activities should be easy to understand and to do while linking in to local heritage and place. Children should be free to choose how they learn, to move around and to be with friends. They should be encouraged to incorporate their own interests into imaginative storytelling processes. There should be a positive, non-stressed and non-judgemental atmosphere where conditions for playful learning and flow can emerge. Strategies for digital augmentation should include scaffolding and support. Children should work towards the goal of a finished digital artefact sharing their processes publicly along the way. There should be opportunities for dialogue and constructing knowledge together

where a sense of belonging and place can be fostered through the making of connections with heritage and with each other.

Table 5-14 DC1 TEChE Evolving Design Sensitivities

<b>Design Sensitivities: Learningful Heritage Play Pedagogy</b>		
DS1	<b>Authentic Learning Environment</b>	<ul style="list-style-type: none"> <li>○ Make connections through a physical concrete experience with local heritage and place</li> <li>○ Allow freedom in the museum to interact with the objects</li> <li>○ In-situ activities should be visual rather than textual, easy to understand and to do</li> </ul>
DS2	<b>Material culture as starting point for engagement</b>	<ul style="list-style-type: none"> <li>○ Harness children's everyday engagement. Support children's interests to foster intrinsic motivation</li> <li>○ Foster creativity through imaginative representation. Factual versus fictional options are context dependant</li> <li>○ Archaeological and historical Information to be age-appropriate level</li> </ul>
DS3	<b>Engagement</b>	<ul style="list-style-type: none"> <li>○ Provide cognitive and affective conditions to provide opportunities for intrinsic motivation and optimal flow experiences</li> <li>○ Ensure challenges are meaningful and doable</li> <li>○ Recognise there will be periods of disengagement and reengagement</li> </ul>
DS4	<b>Positive Affect</b>	Provide opportunities for joyful, enjoyable, voluntary, non-stressed learning. Fun will be an outcome.
DS5	<b>Sharing with Peers/Public</b>	<ul style="list-style-type: none"> <li>○ Important part of a creative learning process and peer-learning process</li> <li>○ Public sharing of their digital artefact important for learning (Papert 1993)</li> </ul>
DS6	<b>Child Autonomy and Agency</b>	<ul style="list-style-type: none"> <li>○ Allow children self-direct and be in control of their own learning</li> <li>○ Allow children choice in their learning and in their physical movements</li> </ul>
DS7	<b>Technology</b>	<ul style="list-style-type: none"> <li>○ Provide supports and scaffolding, feedback and guidance</li> <li>○ Allow children figure out the technology themselves, be a guiding facilitator – use local tech/engineering companies with technical expertise to help heavier technical set-ups</li> <li>○ Use easy to use (free if possible) interactive apps</li> <li>○ Digital play should foster social interaction</li> <li>○ Ensure fairness and sharing of iPads</li> </ul>
DS8	<b>Dialogue and Discussion</b>	<ul style="list-style-type: none"> <li>○ Provide opportunities for co-construction of knowledge</li> <li>○ Develop personal connections and foster a sense of place, identity and belonging</li> </ul>
DS9	<b>Positive team collaboration</b>	<ul style="list-style-type: none"> <li>○ Facilitate friends in teams</li> </ul>

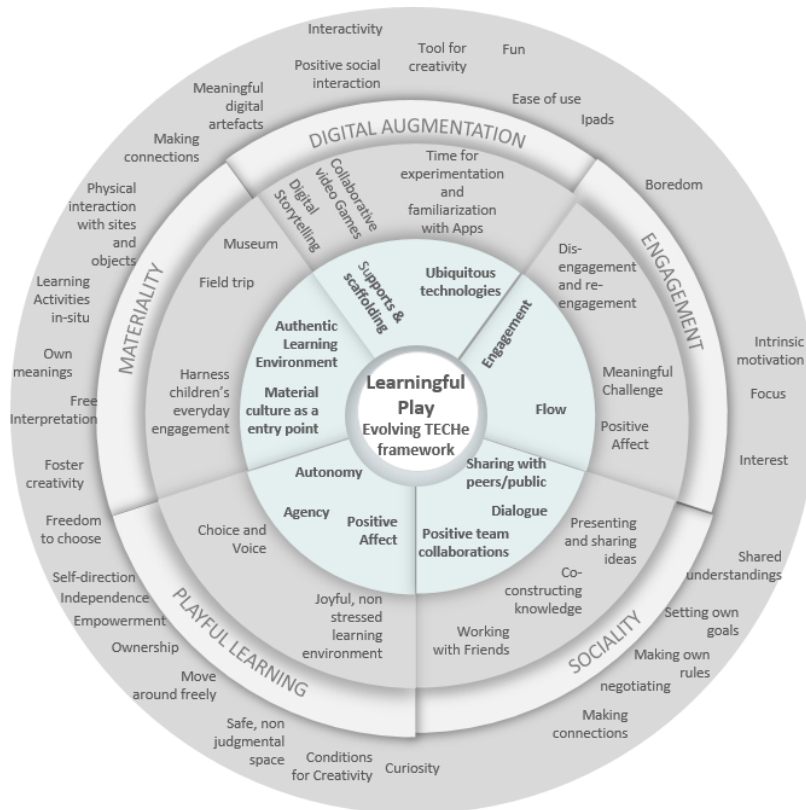


Figure 5-33 DC1 TEChE Evolving Design Sensitivities – At a Glance

## 5.9 Chapter Summary

This chapter has set out the first design cycle of this DBR study. The study's aim is to engage children with their local heritage in the formal and informal learning environments of the school and museum using constructionist technologies. This cycle was undertaken in one school and one museum with different cohorts of children aged between ten to thirteen years. The activities were guided by the TEChE theoretical framework: materiality, digital augmentation, engagement, sociality and playful learning. Data analysis and findings were discussed under the TEChE framework. Findings across the formal and informal learning contexts were discussed and changes were outlined for the following cycle Design Cycle Two. Play developed as a theory in this cycle. Learningful heritage play was evident in the findings. A set of evolving design sensitivities and the TEChE prototype design model for learningful heritage play were outlined. Whereas the museum learning environment in the museum was found to be more conducive to play-based approaches than the school environment, the next cycle aimed to address that imbalance and further develop all children's opportunities for playful learning to enhance their learning and engagement with heritage.

In the following chapter Design Cycle Two, changes were implemented in four schools and one museum in an iterative cycle of design.

## Chapter 6 Design Cycle Two

### 6.1 Principal Study

The exploratory pilot DC1 was detailed in the previous chapter. This second cycle (principal study) of the research was carried out in four different learning environments, three primary schools and one in Galway City Museum. Pupils from the three schools, two town (boys and girls) and one rural (mixed), ranged in age from ten to thirteen years. Children of the same age group and class range (4<sup>th</sup> to 6<sup>th</sup>) attended the museum workshop. As with the pilot study initial discussions took place with the class teachers and the museum's education officer who all kindly gave permission to carry out the research study.

The preliminary research framework was revised for this cycle, the principal study. Each school followed the 2-day plan listed in Figure 6.1 with the museum intervention being adapted to fit over three days. Interventions took place during May to June 2017 (school) and July 2017 (museum). Within the 2-day plan, DST was the medium employed to interact with heritage and place. The same apps. as described in M1.2 were available to children: Comic Life, Animoto, WeVideo, and iMovie. In generating stories in this study children initially:

1. planned stories; researched relevant objects or heritage sites, brainstormed and storyboarded their designs
2. produced stories; gathered images, created art and drawings, synthesised information, used apps. to organise and re-organise their story, edited and exported their movies
3. shared stories; children presented to their class, their teachers and principals in the schools. In the museum they shared their digital stories in a public space

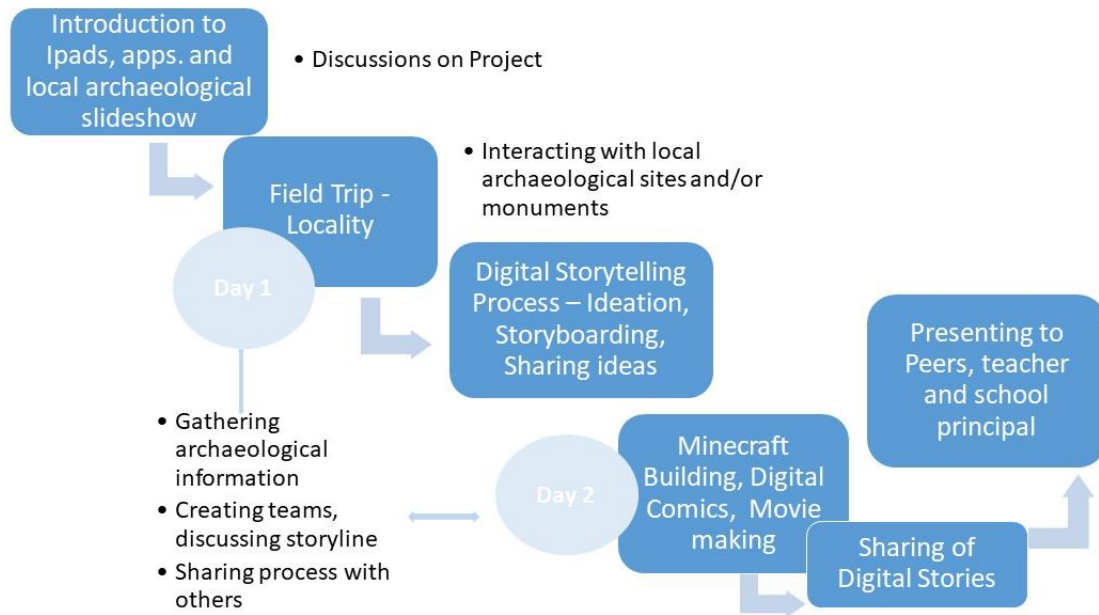


Figure 6-1 DC2 All Schools – Two-Day project plan

In this design cycle video and audio recording was added to the methodological toolkit. This allowed for more focus on learningful play interactions with cultural heritage. Learningful heritage play in the context of the humanities can be understood as meaning making moments or events where a child, within a playful learning environment is engaging his/herself with peers and materiality using technological resources. Materiality is deemed to be the space between tangible and intangible heritage, the point on the continuum where a child is making meaning of local heritage and place. Engagement aligns to active participation, focus, intrinsic motivation and choice in self-regulating children’s learning. As learning is social, when events happen with peers in a positive, non-stressed, playful environment learningful play is happening. In this thesis and especially in the video analysis, a learningful play interaction can be deemed an enjoyable encounter with others, carried out within an authentic playful learning digital environment which fosters children’s inquiry and creativity and affords children choice and voice.

The design evolved from school to school with the intention of the museum (last of the 4 interventions in DC2) to be the capstone intervention. Like in DC1, schools began with a guided tour of their localities. The aim of the field trip was to reacquaint children with their locale, and to introduce the heritage of the area to those that may not have previous opportunities to do so. Before each physical trip, I presented a heritage (archaeological) presentation to the children about the area which we intended to visit. Activities such as scavenger hunts were carried out at the heritage sites to add interest for the children. The aim was for children to interact with heritage while out in the field, and



once back in the classroom to engage in a meaningful creative DST process, and in a positive playful environment to produce a digital artefact, e.g. a digital comic.

### 6.1.1 Data collection

Additional to this cycle data collection methods was the introduction of video and audio recording, focus groups and reflection journals. The methodological breakdown is as follows:

- Visual data : video and drawings
- Audio recordings
- Children’s reflection journals
- Pre and post-questionnaire
  - included fifteen VAS statements
  - Included two/four (pre/post) open-ended questions (on learning and enjoyment)
- Researcher reflections
- Fun Toolkit (Again/Again Table and Fun Sorter) (Read 2008, Read and Mac Farlane 2006)
- Focus groups

#### 6.1.1.1 Coding methods

Video recordings were the main source of data in this design cycle. The video was coded and analysed under the high level engagement lenses outlined in the theoretical framework chapter. Additionally the overarching research question *‘How can we optimally design for children’s engagement with cultural heritage using technologies across formal and informal learning environments?’* was foregrounded. Rather than one-word or short phrases as codes, Saldaña’s advice for qualitative inquiry is careful examination of and reflection on the visual data, documenting through analytic memo or field notes, and generating ‘language-based data that accompany the visual data’ (Saldaña 2013, p. 52). This approach, although selective allows for detailed attention to segments, the various nuances and complexities in visual data, and a broader interpretation of the ‘whole’ of the work (Saldaña 2013).

Visual Data in this design cycle included video and children’s drawings. The video included approx. 108 hours of video data, not including children’s handheld recorders. Additionally, I had the same amount of audio data, as audio recorders were left on each group table to complement the video data. Therefore, because of the enormous amount of potential information on video tapes strategies for coding had to be implemented. Decisions were taken on what would be included as data and what would not, how to find and select the data and how to make comparisons across similar instances (Erickson 2006). As Erickson point out, sampling processes will always be influenced by

theory (2006) as should all design decisions (Ash 2009). Therefore, at this point it was important to critically reflect and clarify my theoretical assumptions that may affect decisions on video taking and analysis. Within social constructivism, learning is social, therefore the video information would need a close study of the interactions to find evidence of learning (Erickson 2006).

Additionally, during the video coding and analysis, and in order to foster student voice, children were given hand held recorders, affording them the opportunity to produce content (audio, video, photos) for their stories, to mediate the engagement with the sites and objects and to interview each other informally about their experiences. In the data analysis all the audio and video from these recordings was examined with a selection transcribed (Appendix O).

### *6.1.1.2 Video research methods*

Many educational research projects now incorporate substantial video components and provide powerful ways of studying detailed teaching and learning practices (Derry et al. 2010). Video as an observation technique was necessary for this research as full ethnographic observation proved to be ineffective for the pilot study, therefore video supported the aim to thoroughly analyse ‘naturally occurring’ activities and events (Heath 2010, p267) in educational settings. Whereas video has been traditionally used for representation and documentation video is especially useful for analysing social actions and for social interaction research (Heath 2010), although many authors point to the many years of practice it takes to get it right (Brauner et al. 2018, Derry et al. 2010). Video as a research tool supports the search for meanings, often made through language and interactions (Cohen et al. 2011, Plowman 1999); a stand-alone video recorder can film continuously, it captures the nuances of social interaction (Erickson 2006) and offers the opportunity to reveal these meanings. However, whereas there is richness of information (Plowman 1999) and detail in video (Denzin and Lincoln 2005) it is important to be aware of the many ethical issues that may arise using video in the classroom and museum. Saldaña has mentioned personal characteristics for a researcher that are essential for successful video coding processes: organisation, perseverance, ability to deal with ambiguity, flexibility, creativity, rigorous ethics, and extensive vocabulary (Saldaña 2013). Because of the degree of inference within coding and depending on the constructs, dimensions or whether the video coding is at macro or micro level, a greater inference may be required, therefore it is important to be critically aware of one’s own assumptions during the process (Brauner 2018). Keeping in mind a high degree of ethical awareness throughout, video enabled me explore and analyse interactions at a deeper level, address the research questions and find evidence of learningful play.

### *6.1.1.3 Video coding method*

Prior to video coding, a content log was set up for indexing all the videos, an example of which is in Appendix Y. The videos were indexed at three minute intervals, and a description of major events happening within the time frame was noted. Derry et al (2010) have pointed to the value of this for getting an overview of data and for further detailed analyses. Derry et al. (2010) in conceptualising video clips/segments, have termed them 'events'. An event can be an overall macro event of a series of subevents, or even categorised down further to micro events (Derry et al. 2010). Care must be taken when 'choosing' selections as these influence the stages of the video research process (Derry et al. 2010). Flow charts as per Ash (2009) were used to highlight significant events (SE) in the video data, each significant event being just large enough to contain one 'meaning-making event' (Ash 2009, p. 216). The flow chart made it easier for Ash to select significant events (Derry et al. 2010). Each event was examined through the TEChE framework lenses of engagement (materiality, sociality, digital augmentation, engagement and playful learning) and through a learningful play lens (a combination of the individual lenses) and their relationship to heritage. Good video research can often blend inductive and deductive coding methods (Derry et al. 2010) and in this research each SE was also coded at a micro-level, through an open coding inductive and deductive approach. For an inductive approach, that is looking at the video from 'whole to part' (p. 183), Erickson 2006 suggests playing the 'event' firstly to get the overall event as a whole, while noting the verbal and nonverbal phenomena and time-coding the event. Secondly, he recommends, reviewing the even again, this time noting shifts in the participant's bodily movements and their listening activities and placing these on a timeline. Within this second run, he suggests selecting a strip of tape of social interaction, transcribing the talk, listening and noting the nonverbal behaviour of all participants within the strip. Then repeat this stage as necessary until enough descriptive information to answer what you are looking for. Similarly (Heath et al 2010) suggest when transcribing segments, to map conversation against the visuals to ensure rigour. For example, if a child said something in a transcribed piece, the gestures, body language, and facial expressions were noted, so as to observe what Heath calls the interplay between social action and interaction (2010).

### *6.1.1.4 Finding significant events in the data*

Ash outlined, in the context of a museum, four types of criteria for significant events: the event has a recognisable beginning and end (normally at one particular exhibit), sustained conversational segments, contain different sources of knowledge and involve inquiry strategies, as in questioning, inferring or predicting (Ash 2009, p. 216). Following Ash, this video analysis found and analysed significant events. Within these, micro level analysis was carried out within the events interactions (Derry et al. 2010). After the events were followed as per Erickson (2006) above, vignettes were

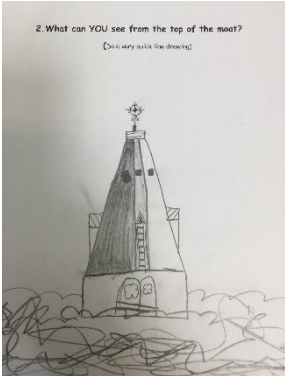



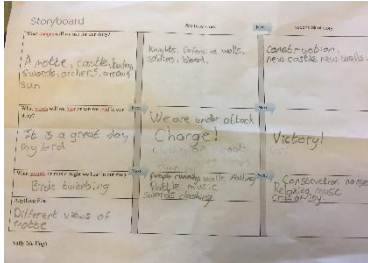
organised and framed within the high level lenses of the *TEChE* framework (materiality, digital augmentation, playful learning, sociality, and engagement). These vignettes became selections for deeper analysis, as detailed above. Although transcription and open coding procedures are time consuming they can identify patterns in the video data sources (Derry et al. 2010). Therefore to ensure reliability, transcription and open coding was carried out to aid triangulation in the data analyses.

### *6.1.1.5 Reflection journals, questionnaires, drawings, fun toolkit, focus groups*

Other sources of data were coded inductively, and themed similar to coding practice of DC1. The Fun toolkits ranked activities in terms of numbered preferences, and were used as a source of triangulation for other data. In planning for learningful play a theoretical coding scheme was developed, drawing on the literature of Gray (2013) and Pedagogy of Play - Project Zero (2016) (play characteristics), O'Brien and Toms (2008) (engagement characteristics), Resnick (2007) & Lucas (2016) (creativity processes). Significant events highlighted from the video data were analysed at a micro-level and triangulated with data from the fun sorters, questionnaires, and reflection journals. These forms of data reflected the experience of the children. As the digital artefacts were quite short and with major challenges such as Wi-Fi, the focus was on the process rather than the finished artefact.

Chapter Six Design Cycle Two

6.2 School 2.3

DC2: S2.3	Overview and Methodologies	
Pre-Visit April 2017	Explaining the project and completion of pre-questionnaire	
<b>Day one: 10th May 2017</b>		
<b>Present: Sally, 2 teachers &amp; tour guide (morning)</b>		
(a) Local Trip	(a) Activity Sheets	
		
(b) Library Session	(b) Video and audio recordings	
	Storytelling strategies – ‘What-if’ Stickies Board – ‘How Might We?’ – Storyboard templates (Fig.6.2).	
		
		
<i>Figure 6-2 DC2 S2.3 Storytelling strategies (L-R): What-if Stickies Board - How Might we? -Storyboards</i>		
<b>Day two: 11<sup>th</sup> May 2017</b>		
<b>Present: Sally and teacher</b>		
Day Two:	Video and audio recordings	
(a) developing and sharing story ideas	Post-questionnaire	
(b) constructing and presenting digital artefacts	Fun Toolkit	
	Reflection journals (for completion at home)	

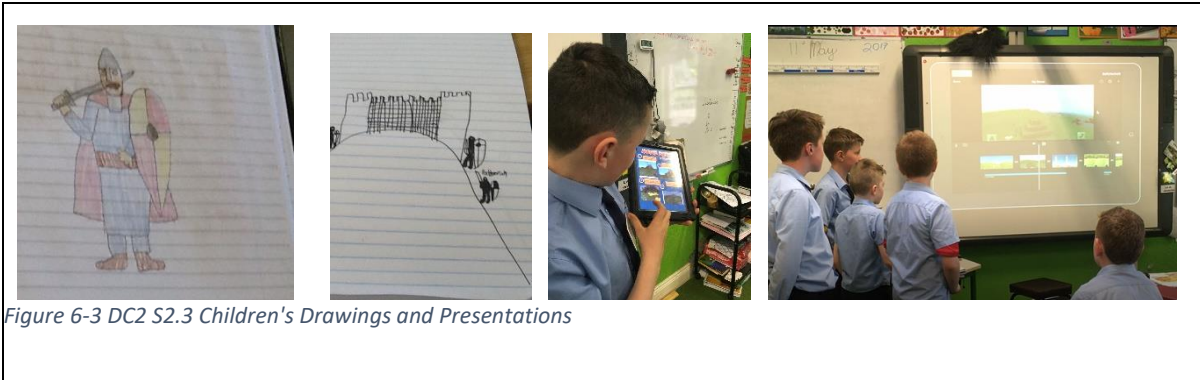


Figure 6-3 DC2 S2.3 Children's Drawings and Presentations

Figure 6-4 DC2 S2.3 Two- Day Overview

## 6.2.1 Two-Day Overview

### 6.2.1.1 Day one



Figure 6-5 DC2 S2.3 Day One -Out-of-school Learning - Local trip and Library session

This two day intervention took place in a rural midlands school (Fig. 6.4). All 23 pupils of mixed gender (aged 10-13 years) took part in the project. Day One began with a morning field trip to the local town 12<sup>th</sup> century Norman motte, the highest existing one in Ireland, and its adjoining church graveyard. The town is situated on a high altitude, therefore the motte itself (535 ft.) has panoramic views that stretch to nine different counties. A timber castle once would have stood on this motte but there are no extant remains of a castle for children to explore or experience. However developing a sense of place involves an understanding of these previous settlements, how they expanded, contracted or were deserted, and their connections with other places/sites that may or may not today have tangible monuments (Carman 2002). Therefore this guided field-trip climbing the motte offered opportunities to develop place awareness in children. Before the children left for the field trip, a short presentation was made showing images of mottes on Ireland and Europe, and what they may have looked like in their day. I gave the children activities on the motte along with iPads and small handheld cameras to collect footage for their stories. After the morning trip, the afternoon session was held in the town library (Fig.6.5). Here the children discussed ideas and brainstormed ideas for their stories, which would be 'made' the following day.



6.2.1.2 Day two

Day Two was held in the school (Fig. 6.6). The day involved writing the story, choosing apps, sharing their ongoing processes and constructing their digital artefacts which were shared with the class at the end of the day. Post-questionnaires and Fun Toolkit were completed by children on the day with reflection journals completed at home. A stamped-addressed envelope was left with the teacher, who duly posted the journals to me. A follow up focus group was held with six of the participants in June 2017.



Figure 6-6 DC2 S2.3 Data Capture and Classroom Set-up

6.2.2 Findings

6.2.2.1 Materiality

A key feature of this design model is the physical interaction with local sites. Although the motte is within the town, six of the 23 children had never climbed it before. Children were excited about climbing the motte and although some data revealed anxiousness children enjoyed the experience.

	<p>-“It’s steep, I could fall at any moment now”                  -“I’m keeping behind [Child1] as he might fall”                  -“I am afraid”                  -“I climbed this before”                  -“It’s going to be hard”                  -“I don’t want to do this – Yeah I’m afraid”                  -“I can’t wait to go down” [excitement]</p>
	<p>E: Howya H what are you doing                  H: I’m taking pictures of the view, which is amazing                  E: Thanks. What do you like about the moat*?                  H: I like everything about the moat, the vieeew, the peace and quuuuiet, is just so fun</p> <p>*the motte is known locally as the moat</p>

Figure 6-7 DC2 S2.3 Vignette 1 - Materiality – Climbing the Motte

Although the physical aspect of climbing the motte was challenging, and was the hardest part of the workshop (11 UOMs of 22), it was also the favourite part of the two day project (19 UOMs out of 37). However, according to the focus group data parts ‘were real bland’, like the tour guide talking for too long. Being out of school was preferred than the technological aspect of the workshop because they were out of school, and liked learning in the library:

<p>“It was all easy enough but climbing the motte was hardest”</p>	<p>(child S2.3)</p>
<p>“Going up on the motte and seeing the view was class”</p>	<p>(child S2.3)</p>

From the questionnaire on what did the children learn it was found that children believed they learnt about history of the Norman motte, that history is interesting and not boring (Table 6.1). Nineteen of the 21 UOMs related to history:

<p>“I learned that history is not boring”</p>	<p>(child S2.3)</p>
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## Chapter Six Design Cycle Two

"I learned that they built timber castles before stone castles and the found gold under the motte"	(child S2.3)
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Table 6-1 DC2 S2.3 Questionnaire - What did you learn during the project?

About the Motte	History	Technology
11	8	2

In the VAS statements in the questionnaire (Appendix F) it was found that for 45% of the children history had become less boring after the intervention (N=10). 82% (N=18) did not agree with the statement '*History is boring*' after the intervention. Heritage became more interesting for 12 children (55%), 50% enjoyed learning history more (N=11), and there was an increase of 4 children who liked exploring history and heritage in different ways (55%).

Data from 125 drawings indicate 104 were heritage related (83%), consisting mostly of the motte, the views from the motte or the act of climbing the motte. Many drawings detailed imaginary castles on the motte as well as defenders with swords, bows and arrows and the act of castle destruction. From the drawings, it can be inferred the physical trip of climbing and being out of school on the local motte was of more interest to the children than the technological aspect of the project.

Place consciousness – sense of place and belonging

The use of the small hand held cameras proved invaluable for capturing the perspective of the child. From all the data, it is evident the children formed a connection with the motte. Asked in the focus group whether the overall experience had given them an interest in their heritage all replied positively. '*Definitely*' one boy replied. Some of the children's verbatim replies are included in the poetry analysis below (Fig. 6.8) which shows how they children value being in place, on the motte as opposed to sitting at a desk looking at a history book. One boy felt like an architect, another like an archaeologist. This poem based on verbatim data displays excitement, nervous anticipation of the climb yet loving the freedom of it at the same time. It evidences their feelings of belonging and attachment to place and the ownership of their heritage.

**Climbing the Motte**

*The Motte is what the whole project is about  
climb the motte and learn more herigge*

*I wonder how they were able to make it so steep  
I could fall at any moment now  
I climbed this before...  
So well engineered*

*Climbing the motte was the hardest  
it was my first time on the mote  
I was really excited...  
I don't want to do this  
I'm afraid  
I almost slipped*

*My favourite part  
with my friends  
being up high  
in a class  
climbing the motte*

*I love that we could see everything from the top  
nine counties and the five lakes  
view was amazing  
peace and quiet, class*

*I liked coming down the motte  
it was slippy, steep and bumpy,  
slippy because of the rocks*

*It was fun  
I love we did something different  
rather than school work  
instead of just sitting there  
in a classroom  
looking at a picture of it  
looking at a history book.  
You were like working.  
You're ON it.  
You can experience what it's really like.*

*I learned about the motte, the castle on the motte  
how they built timber castles before stone castles  
and they found gold under the motte*

*I learned that history is not boring*

*I know about this now  
[I] feel like an architect  
[I] feel like [I] own it*

*It's mine.*

Figure 6-8 DC2 S2.3 Materiality - Poem - Climbing the Motte

Between the intervention and the focus group the motte was looted (Armstrong 2017). I asked the children their feelings on the looting. They were outraged. One boy said 'not good' repeated by 'not good at all'. They felt it was not right, it should not have been touched, even if there was treasure it

should be left there, that it was their motte. One boy explained how when he got to explore the motte he realised he did not know much about it, now *'I know about this now so I own...you feel like you own it'*. Another child expressed ownership *'this is [Town 1's] moat and I live (around Town 1)... it's mine'*.

Additionally while on the field trip one child mentioned she had seen an old unreadable street sign. The children displayed pride telling me that it was now painted *'and that's thanks to us yeah'* (see Vignette 2).

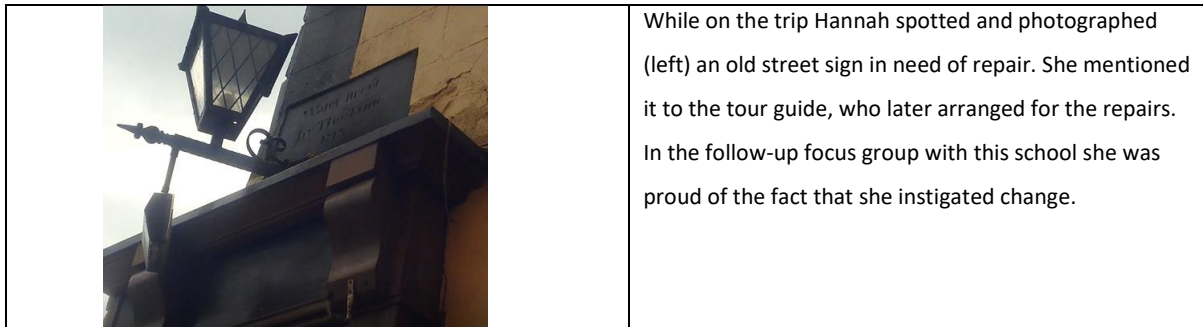


Figure 6-9 DC2 S2.3 Vignette 2 - Materiality- Developing Pride in Place –Place-consciousness

### 6.2.2.2 Digital augmentation

Novelty of Minecraft

Minecraft proved to be a novel concept in the classroom. Five of the eight teams were involved in the playing of Minecraft. Data from audio recorders and focus groups indicate children were involved in blowing up other teams castles. Another girl from a team of three broke away to work on her own. Although her time was limited with sharing the iPad with her team, she managed to build an intricate castle feature, the staircase. All children were proud of their creations evident though sharing with peers and the class.

<p>Team Paul, Terry and Daniel</p> <p>Day One:</p>	<p>This team while doing the What-If activity discuss how to play Minecraft, and offer to help each other learn to use Minecraft for their story.</p> <p>Boy E asks Paul something about helping him. He mentions he has Minecraft on his Xbox</p> <p>Boy E: Could I bring you over cos I haven't got past the start [inaudible]</p> <p>Paul: I know how to play Minecraft, it's really good</p> <p>D: How do you connect with other people?</p> <p>P: You need friends.</p> <p>D:: I've two What-ifs</p> <p>P: It's in Minecraft but its 2D. I might ...I might bring you over and I'll show ya sometime</p> <p>D: I've two what-ifs.</p> <p>P: I might show you sometime</p> <p>D: What if ((inaudible)) the castle and what if there was treasure nearby.</p> <p>P::That's a good one</p> <p>D: Treasure under?</p> <p>D: Yeah. Paul what is ((inaudible))</p> <p>Paul explains about 2D and the other child said they might get it. Fifteen minutes later after the activity and sharing their story ideas, they discuss how to build their story in Minecraft and Paul gives a tip to another boy what to look up later at home about Minecraft.</p>
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Figure 6-10 DC2 S2.3 Vignette 3 – Digital Augmentation - Novelty of Minecraft

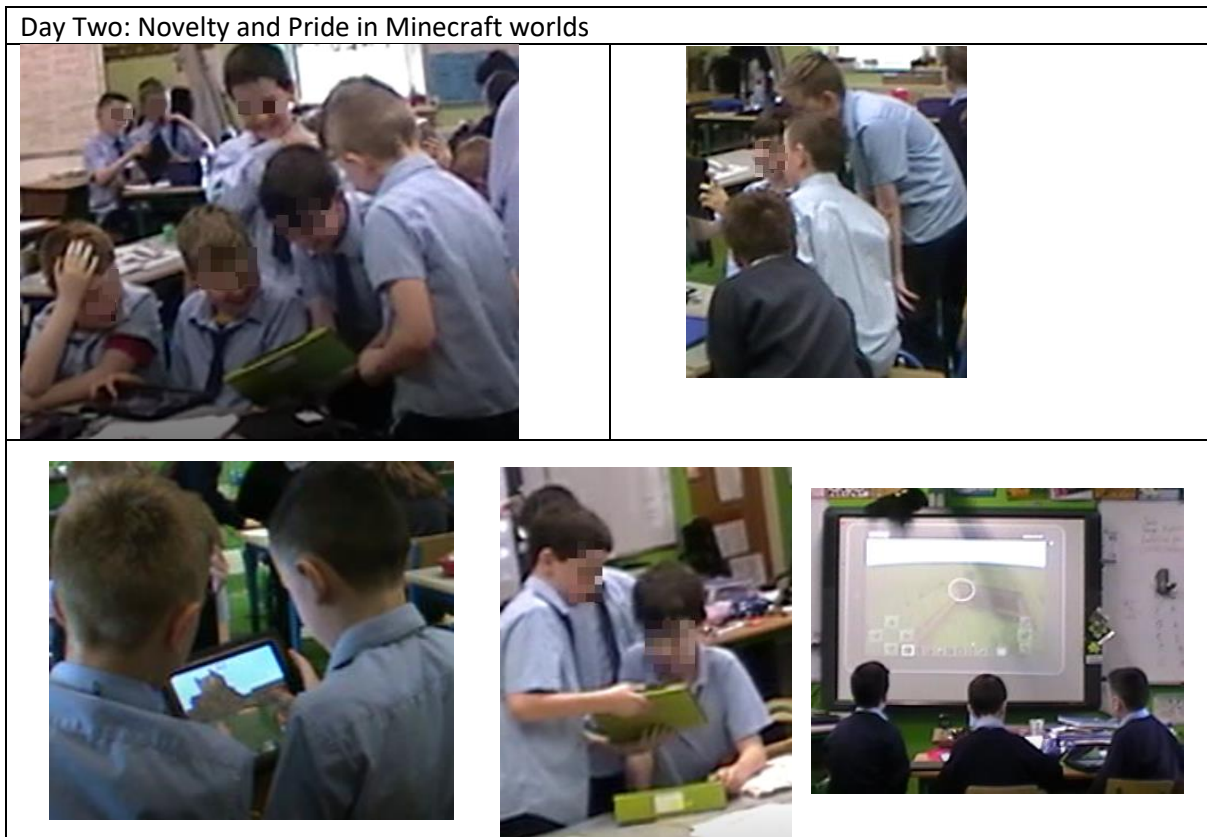


Figure 6-11 DC2 S2.3 Vignette 4 – Digital Augmentation - Novelty of Minecraft

#### Challenges with Minecraft

When Wi-Fi worked and when children could reflect their worlds and work onto the screens (sharing the process as they went) the children showed great pride and excitement. This school being in the countryside did not have access to high speed broadband. Tensions surrounded the playing of Minecraft. One such example is at the end of the day before group presentations Paul’s team noticed Luke was in their Minecraft world. Luke was standing beside them with his iPad. “Can I blow up your castle?” he asks. An argument ensued who is in whose worlds and also about turns playing Minecraft. I asked them were they taking screenshots for their comics. Paul seemed agitated “yes, I’m taking screenshots now”. I asked them to turn off the Wi-Fi as we needed to share it around for presentations, but some children continued to play survival mode in Minecraft. I noticed and pointed out we would have to quit Minecraft if it was not being used for their stories.



Figure 6-12 DC2 S2.3 Vignette 5 – Digital Augmentation- Minecraft Issues

In the focus group data children spoke about challenges with Minecraft with griefing (blowing up and destroying other people's worlds). They told me it was going on in the classroom and complained about the children doing it. However, three children said how *'It feels fun when you blow up someone's world'* with TNT (the Minecraft explosive). When pressed on how to stop griefing, children suggested some free play time TNT (ten minute time) to build, play and get it out of your system.

#### Technology as a distraction

Apart from the challenges of playing Minecraft itself, iPads and apps were causing children to argue and become distracted. In this vignette, arguments were taking place while others are involved in the class activities.



## Chapter Six Design Cycle Two


<p>Town Library Location – Day One – After Trip to Motte – Informal discussions during <i>What-If</i> Activity</p>	
	<p>Class is doing the brainstorming activity 'What-If' Two of the members of this team are arguing over the iPads and apps and are not involving themselves in the activity.</p> <p>Boy A: you were too busy talking          Boy B: so everything is bad if you don't get a screen, is that it          Boy A: Kevin, your face doesn't have be 2 centimetres away from it</p> <p>I am talking in the background about placing their What-if stickies on the board. Boys ask each other what is it they have to do but then go back to discussing the iPads. Jasper says he tried out all apps.</p> <p>Jasper: 'WeVideo' is the best'          Boy B: How do you know?          Jasper: I've tried them all out all of them          Boy B: well, you haven't tried out Comic Life          Jasper: I have          Boy B: child2 (sister) said it costs money          Jasper: no, it doesn't cost money</p> <p>Teacher assistant notices comes up to them and asks them what is it I want them to do. They do not know. As children take it in turns to read out the What-ifs, the boys continue arguing about who gets the iPad and the small cameras. Soon after that they turn off the audio recorder at 36:08 into the session with a comment about the use of the recorder being linked to the FBI.</p>
<p>School – Day Two</p>	
<p>Audio recorder:</p>	<p>Austin calls Terry (older boy) who is on another team.          Austin: Terry I'm going joining in the game          Susan (Austin's team mate): you're not going to Minecraft          Austin: I am          Another child: Yeah, but I can play as well on it          Eleanor : you're going to ((in audible))          [Austin does not get to play Minecraft]</p>

Figure 6-13 DC2 S2.3 Vignette 6 - Digital Augmentation- Disagreements over Technology Use

Sharing of the iPads caused issues in the making of artefacts especially when using Minecraft:

*"I was building Minecraft and they were like give it to me now and like I wasn't finished it and if I went out of it it deleted so I'd have to start again and they were like...they kept wanting it".*

Some teams did manage to share the Minecraft building:

*"Me and Jasper did the moat but we were like.. he was saying ..oh we'll do this so then he done that and then say I'd say we'll put a bailey here and then I'd put the bailey down...like we were sharing it then."*

Another child stated his team set timers and shared the iPad so everyone got 10 -15 minutes on Minecraft. However, the video evidence showed this to be untrue as this boy had not shared at all which was a cause of arguments and exclusion of others at his table (see vignette 10 Fig. 6.18).

Wi-Fi frustrations

Wi-Fi issues were problematic in this intervention. Much of my time as a facilitator involved trying to help children get their stories exported from the individual apps as well as trying to reflect their processes from the iPads to the large classroom whiteboard for sharing with others. Equally my time was spent checking and turning off everyone else’s Wi-Fi on their iPads to allow more bandwidth for children presenting their work onto the class whiteboard through an app called Reflector. Naturally, the situation was very frustrating for the children as well as for myself and the teacher. From my point of view, delays meant I was not available to help or scaffold other children’s learning throughout our short time together. Children were constantly trying to upload/export their videos from the video apps. The only spot that had best Wi-Fi was at the classroom door so a lot of children congregated there at various points throughout the day.



	<p>Susan shows her project to another team. Although proud of her artefact she evidences frustration:</p> <p>“We waited like 20 minutes for that to download”</p>
	<p>Many times when children tried to present their work Wi-Fi issues prevented them from reflecting their work onto the classroom whiteboard.</p>

Figure 6-14 DC2 S2.3 Vignette 7 - Digital Augmentation - Wi-Fi Challenges

Positives of technology

Many of the children interacted positively with the technologies, despite the challenges. As was evident from their digital artefacts, they showed persistence and played around with more than one

app. If Animoto did not work, they tried iMovie, WeVideo or Comic Life. At the beginning of day two, I encouraged teams to try a different app depending on their different needs. However, as the day went on, because of the Wi-Fi delays, time delays and potential frustrations I encouraged children to stay with the app. Comic Life. From the focus group data one girl spoke positively about why she preferred interactivity with technology for learning. Working on technology was a fun way to learn about heritage 'cos a book like is really blank like it doesn't move it just sits there'. Additionally, she mentioned the coolness of using Minecraft to place blocks, as in the stairs up to the castle rather than traditional drawing (the block can be deleted rather than having to erase drawing) as well as for imagining and building the motte in the way she wanted. Two of the children said at the focus groups they had built the motte and a town since the intervention. Many times children asked advice on their uploads and what they could do within the constraints. I can be heard many times advising them to do a comic as was the easiest load on Wi-Fi. Yet despite the challenges, all teams managed to make one artefact, some teams produced three artefacts. John's team developed their last one quickly as a result of seeing another team present theirs.

Peer Learning

Children helped each other learn about the iPads and the technologies:

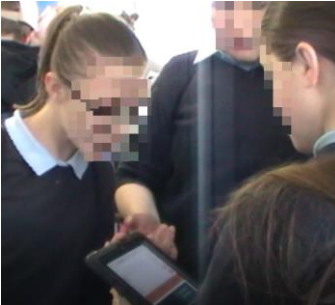

	<p>Girls were trying to figure out how to work the iPads before they went on their field trip. One girl swipes the iPad and something happens to make them exclaim. Hannah is passing.                  Hannah: That happened mine, just press hold                  Susan: Yeah, what you mean                  Hannah: It was in Safari (takes out her iPad)                  Hannah: if you go into safari                  Eleanor : I can't find it                  Hannah holds up her iPad                  Hannah: See...Safari                  Eleanor : I should have all this on my phone</p>
	<p>Hannah goes on to discuss with girls other features of the iPad</p>

Figure 6-15 DC2 S2.3 Vignette 8 - Sociality - Seeking Help from Peers

Challenges with technology

Technology was ranked lower than physical interactions with heritage in the most favourite activity in children's reflection journals. There were 14 references to technology (out of 37 UOMs: iPads (N=6), Making (N=5), Taking pictures (N=3):



"on the iPad playing Minecraft making the motte"	(child S2.3)
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Five children found it hard to figure out the technology (N=5, out of 21 UOM):

"trying to work out the apps"	(child S2.3)
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Being a sole researcher and having no help was a factor in scaffolding and supporting children. Because of these challenges and frustrations children did not believe they learnt a lot about technology. When asked in the questionnaire what did they learn, only two UOMs out of 21 referenced technology.

#### Children's drawings and technology

There were 125 drawings on the reflection journals from the children (Appendix Z), 14 of which are



associated with technology alone (11%). Seven images include heritage and technology together (6%) (Fig. 6.16). With 83% of the children's drawings relating to heritage alone, it can be inferred the physical trip of climbing and being out of school on the local motte was of more interest to the children than the technological aspect of the project.

Figure 6-16 DC2 S2.3 Heritage AND Technology in Children's Drawings

Regarding the two statements regarding technology and heritage (a) *Heritage is more interesting when using computers* and (b) *Technology makes learning history and heritage more interesting* produced similar results, 77% (N=17) and 91% (N=20) agreed with (a) and (b) respectively after the intervention. Agreement with both statements increased by 18% (N=4). However, those disagreeing with statement (a) increased by 9% (N=2), and with statement (b) decreased by 9% (N=2).

#### Digital storytelling process - narrative

In the focus groups, when asked whether the programme was too hard, three said no and three said some parts, like working with 'annoying' team members. The story writing itself they did not find hard, it was the thinking of and bringing together of ideas that was challenging '*We didn't have any ideas though*'. In Paul's team of three they used voting as a method to carry their ideas forward. In the reflection journals five children said the story writing was the hardest part.

"I think coming up with a story was the hardest bit because I had no ideas"	(child S2.3)
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6.2.2.3 Engagement

Anna and Evelyn’s team had written down all the names on the grave-slabs in the Norman graveyard. In her team of two, both girls used the names they had gathered as starting points for characters for their story. By naming their characters that had meaning for them this team evidenced pride, focus and engagement.

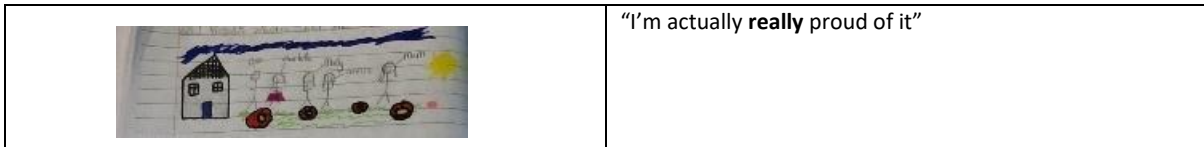





Figure 6-17 DC2 S2.3 Vignette 9 – Engagement - Pride

6.2.2.4 Sociality

Many teams worked well together and there was evidence of good collaboration. However, not all teams got along. The following vignettes shows examples of negative social interactions between children

<p>School 2.3 (K)</p>	
<p>Sociality - Group Work-Interactivity</p>	
	<p>This group initially has four members. Boy A is focused on story writing and he tries to get team working on a script. This team are being continuously distracted by another boy from a neighbouring team (Boy D). Boy A asks ‘Jasper, can we please get started now, come on can we get started?’ After twenty minutes has elapsed Boy A announces ‘‘come on, we need to start the story’, five minutes later he announces he is boss now although no one listens to him. By now boy A is writing the story himself and the others are not involved. Boy C comes up to me and asks me something and I go down to their table to help them, I suggest a comic book as may be easier for them to begin with.</p>
	<p>Arguments begin at the table 15 minutes later. Boy A asks them to stop arguing and continues writing story. He turns away from Jasper. As Jasper has not shared his iPad I give the team another iPad and they split into two groups.</p>
	<p>Jasper has been engrossed with building with Minecraft since the beginning. However, he does not give his team mate Eoin any turn with the iPad. Eoin plays with a fidget spinner as Jasper plays Minecraft with the iPad.</p>

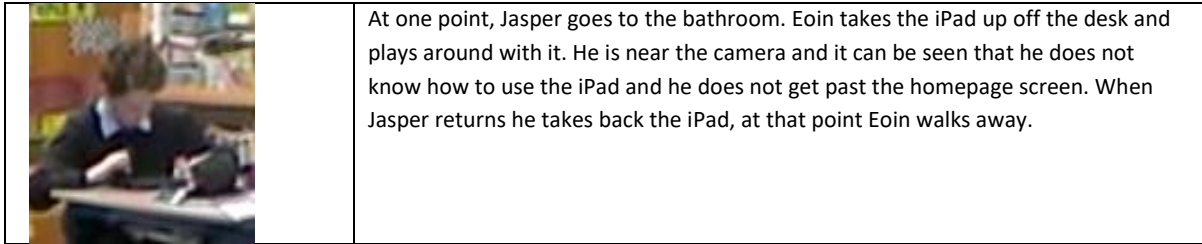


Figure 6-18 DC2 S2.3 Vignette 10 – Sociality – Collaboration Challenges

*Working in Teams* was ranked the lowest in this school's Fun Sorter (N=6) yet 13 children (57%) said YES in the Again-Again table to working in teams. In the focus groups children expressed surprise at these figures. One child noted regarding the ranking of activities on the Fun Sorter:

*"It's more because you're putting like all the other like activities in front and then you forget about the teams and then you have to put it at the end really"*

Difficulties and challenges, such as hard to agree themes with each other, hard to think of an idea and to bring it all together were mentioned as being reasons for teams not getting on together. The number of iPads given to children was a factor in the working of teams. I had the use of ten iPads which were divided out amongst the class. One boy commented how his team of four initially had one iPad but when they were given two iPads they were able to do sub-teams of two, each team doing one story each. There was less 'fighting' and easier to set roles in the teams. One child noted:

*"It was working good with the four but it went better with the two cos you're getting more ideas and you've more use of the iPad"*

One child explained how role setting worked within their teams. One person had the *'the iPad at a time and the other person the recorder and the other taking down things'*. Another child's experience was *'everyone was fighting on our team over the iPad, they didn't want to do the recording cos they thought it was very boring (just holding it)'*. The handheld recorders were supposed to be used for interviewing or recording processes with each other but *'some of them were just messing and just shoving it up in peoples faces'* although one boy commented how he *'thought the recording was very good'*. When asked whether roles should be allocated to future teams to avoid disagreements and arguments all children replied no, children should be allowed make up their own rules and set their own roles.

Positive social interaction allowed teams work in a non-stressed environment, a criterion of a playful learning environment. For example one team managed to make two time-lapse and an Animoto short video using their imaginative drawings related to the motte and its castle. When they presented their work at a later point, the music they had attached attracted attentions from others. One older child from another team stands up and gestures to his team mates to watch, and the rest of the class are ‘heads-up’ focused and engaged for this teams presentation for which they receive a round of applause. In follow up reflections and their drawings these team members show evidence of engagement with heritage though the use of technology. However, collaboration did not work everywhere as seen in vignette 10 (Fig. 6.18). In this vignette, technology was a main contributor to the team not getting along and the cause of arguments.

#### 6.2.2.5 Playful Learning

Playful and creative learning is key to this research design and to the development of a playful learning environment. Characteristics of the creative process were evident in different teams work throughout the day. The brainstorming exercises the previous day helped towards imagining and converging ideas for their story. On the previous day Paul and his team displayed evidence for convergence of story ideas during the What-If brainstorming activities. Sharing was held throughout in order to build on others ideas, reflect on their own and re-iterate their stories and artefacts.

Louise, Paul and John’s team had the best working relationships. Evidence can be found here of voluntary participation, non-stressed atmosphere and other playful learning indicators. This vignette shows an example of persistence, a key characteristic of the creative process (Lucas 2016).

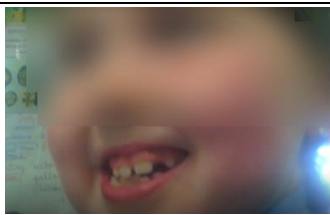
	<p>L: What are you making?  E: I’m making... [smiles] a movie on Animoto  L: Animoto doesn’t work in that tablet  E: I think it does  L: it doesn’t’ I tried it  E: Ok::: Then I’ll go on to WeVideo</p>
---	--

Figure 6-19 DC2 S2.3 Vignette 11 Creative Learning – Persistence

Positive affect

In the focus groups I asked the six children what was fun and enjoyable about the project. Learning through interactive technology, learning outside school, being outside of school, having freedom, being with friends and being free to talk and chat whenever they wanted were positive features of the design for these children. School is strict and they are obliged to follow strict behavioural guidelines. When I asked at the end was there anything else I should know, four of the six children called ‘*Do it again*’. The other two children explained they would be leaving primary school that month.

In the reflection journals children were asked did they enjoy the project (Table 6.2). The most reason they enjoyed the project was related to positive affect, the fun, excitement and liking of what they were doing. They enjoyed learning this way, they enjoyed being away from school and the physical aspect of the field trip. Of the 27 UOMs to this question, coded inductively, only one UOM related to technology (Minecraft).

Table 6-2 DC2 S2.3 Did you enjoy the project? Why? Why not?

Positive Affect- Fun exciting	Learning	No School	Climbing /Physical aspect	Technology
11	7	5	3	1
“I enjoyed the project because we got no school”				(child S2.3)
“yes I did because I love building in minecraft”				(child S2.3)

6.2.2.6 Learningful play

In the significant events analysed under 'learningful play', positive affect, engagement, pride, joyful playful learning, connecting with each other and thinking creatively, being adaptable when faced with technological issues, were all present. These moments of meaning making signify learningful heritage play.

	 <p>Child A: This is Girl B's one (swipes on iPad)</p> <p>Child videoing: mmmh</p> <p>Child A : and this is my one (points in) they're attacking the castle</p> <p>Child videoing: yes</p> <p>Child A : (swipes back to Girl B's one) And then this is Girl B's one where they're defending and they're attacking...and then that's the other side</p> <p>Child videoing:: and then what's Child C doing here (camera turns to Deirdre )</p> <p>( Child C is smiling and drawing)</p> <p>Child A : Child C 's going to do a castle on the moat</p> <p>Finished artefacts: Timelapse movie and Animoto</p>
--	---

Figure 6-20 DC2 S2.3 Vignette 12 - Learningful Play

The following vignette shows evidence of focus and engagement. Many times, Paul was evidenced in flow, when not realising it was lunch time, staying on in the classroom and discussing with me about what he was doing. He displayed nervous excitement when sharing teams work with others.

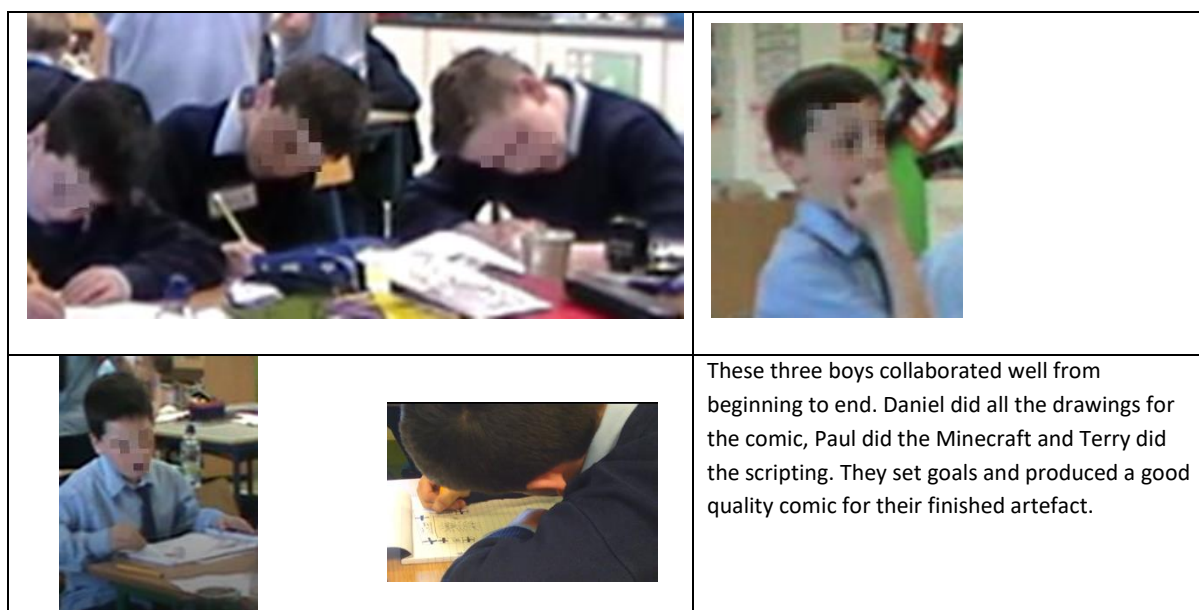


Figure 6-21 DC2 S2.3 Vignette 13 - Learningful Play

### 6.2.2.7 Fun toolkit

The Fun Toolkit findings indicates technology is more enjoyable than learning outside of school. Using iPads (N=12) and learning outside of school (N=7) were children’s top two favourite activities in the Fun Sorter (Table 6.3) with both being equal in the Again-Again table (N=19) (Table 6.4). The highest activity children would do again is ‘Taking Photos’ (N=21). Low down the rankings and similar to the previous DC1 is the story writing process (N=5). In this school ‘Working with teams’ was ranked lowest in the Fun sorter (N=6) and triangulated in the Again-Again table where 13 (57%) only said YES to working in teams again. These findings triangulated with the video data findings, where problems with collaboration and the story writing process were noted.

Table 6-3 DC2 S2.3 Ranking of Fun Sorter Activities

Ranking of Activities	Rank no.	Number One Activity	Number One and Two Activities (Combined)
School (n=23)	2.3	1	Using iPads (n=10)
		2	Using iPads (n=12)
		2	Learning about my place (n=3)
		2	Learning about my place (n=7)
		2	Looking for and finding information on my story (n=3)
		2	(n=6) Looking for and finding information on my story
		2	Learning outside of school (n=3)
	9	Working with teams (n=6)	[Number 9 and 8 ranking combined]
		Thinking of and writing the story (n=5)	Thinking of and writing the story (n=9)
		Making the story (n=3)	Making the story (n=8)
		Using iPads (n=3)	Working with teams (n=7)

\*Green – 1<sup>st</sup> ranked choice, Blue 2<sup>nd</sup> ranked choice, Orange 3<sup>rd</sup> ranked choice



Table 6-4 DC2 S2.3 Again-Again Table

Ranking of Activities – Again-Again Table	N= 23			
	School 2.3 (n=23) 1	YES	NO	MAYBE
Taking photos	21	0	2	1
visit my town and learn about my place	19	0	2	2
use technology (example iPads, tablets for learning)	19	0	2	2
Learn in a different place for school	17	0	5	1
Use apps for history class	17	0	5	1
Work together on teams	13	0	9	1
Making a digital story	12	0	10	1
Search for information on your story	12	2	8	1
Write a script	3	8	11	1
*Green – 1 <sup>st</sup> ranked choice, Blue 2 <sup>nd</sup> ranked choice, Orange 3 <sup>rd</sup> ranked choice				

### 6.2.3 Summary of findings

The findings indicate children enjoyed the physical side of the overall project more than the technological aspect. Their favourite activity was the physical heritage trip. Although the children were excited about the field trip they found it quite challenging. They made strong connections with their local heritage which correlates with their drawings. Overall, they learned about history, history became less boring. They enjoyed learning history more and their interest in heritage increased post interventions. They displayed pride in place, showing focus and flow through the learning experience and evidenced high levels of heritage engagement. They enjoyed *Using iPads*, *Learning out of school* and taking photos. However, there were many challenges. Technological issues included Wi-Fi restrictions affecting the making of artefacts and presenting to others via whiteboard. The novelty of technology proved a distraction. Sharing of the iPads made it challenging for children to get things done, however children managed to work it out between themselves and create final digital artefacts. There was frustrations with the time the technological challenges took up although children persisted in face of these challenges. Technological issues challenged me as a researcher; I had little time for scaffolding and supports while carrying out the project. However, even with all the technology frustrations there was an increase in the number of children who agreed technology enhanced interest in heritage post intervention. Children liked the interactivity of the technology and the physical out of school learning. Some preferred this type of learning than through books or via traditional teaching methods. Children had challenges with group work. *Working in teams* was the lowest ranked enjoyable activity in list of activities; iPad issues and disagreements over story ideas formed a large reason. Children found coming up with ideas hard in the story writing process. Although there were tensions and arguments between the children, many to do with Minecraft and sharing of iPads, there was evidence of good collaboration between children. Even with arguments children



persisted and liked working team issues out themselves. Positive affect was rated highly and children enjoyed an overall positive learning experience. Learningful heritage play was present in this data.

#### 6.2.4 Design changes resulting from S2.3 intervention

The following design changes were implemented for School 2.4, which was timetabled for the following week (Table 6.5). Activities were added, amended and discontinued. More time at story writing was needed, therefore the children would be asked to complete the storyboards at home. With some helpful advice from the teacher on the improvement of the design she suggested taking less images when they went on the tour. Therefore, in the next school children would be asked to only use four images in their comics. Given the challenges with time and technological constraints, the next class should do a ‘practice’ comic and iMovie together to learn the apps. Additionally, I aimed to speak to the teacher in the following school about children and self-selecting teams.

*Table 6-5 DC2 Evolving Design Changes - School 2.3 to 2.4*

Design changes from School 2.3 to 2.4		
No ‘How Might We’ exercise?	Storyboard template to be completed at home	Shorten ‘What If’ exercise
Limit Comic Life to 4 images	Preparation of comic and iMovie together as a class	Do a Post-Its activity on the field trip experience and app. choice for following day

6.3 School 2.4


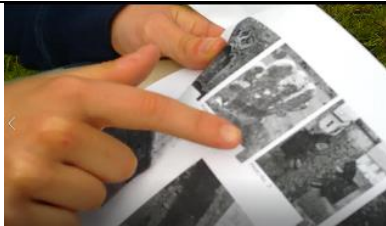


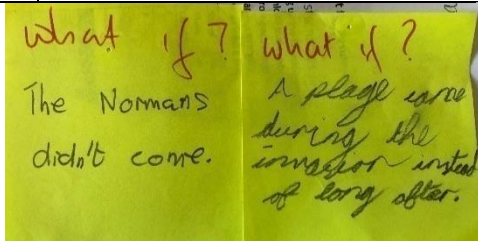
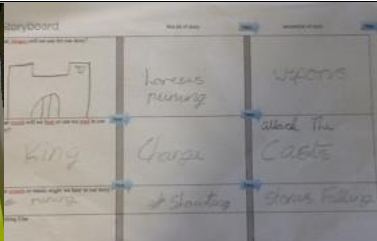

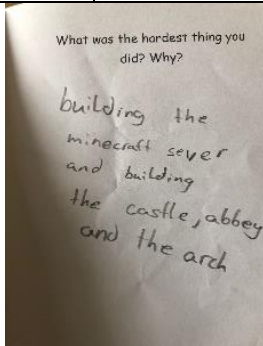
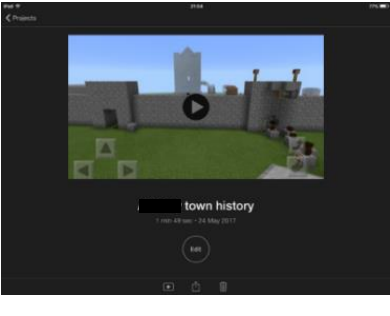
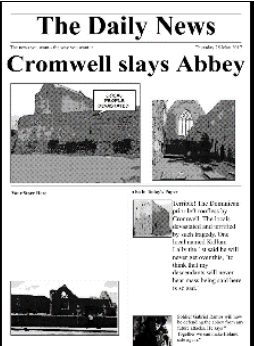
DC2: S2.4	Overview and Methodologies
Pre-Visit April 2017	Explaining the project and completion of pre-questionnaire
<b>Day One: 16<sup>th</sup> May 2017</b>	
<b>Present: Present: Sally, Damhnait and Teacher</b>	
(a) Local Trip	(a) Activity Sheets
	 
(b) School classroom	(b) Video and audio recordings Storytelling strategies: - What-if Stickies Board– Creative corner- Storyboards
	 
<b>Day Two: 11<sup>th</sup> May 2017</b>	
<b>Present: Sally, Tony, Damhnait and Teacher</b>	
Day Two:	Video and audio recordings
(a) developing and sharing story ideas	Post-questionnaire Fun Toolkit
(b) constructing and presenting digital artefacts	Reflection journals (for completion at home)
	  

Figure 6-22 DC2 S2.4 Two-Day School Overview

### 6.3.1 Two-Day Overview

#### 6.3.1.1 Day one

This two day intervention took place in a town boy's school with 22 pupils (Fig. 6.22). Day one began with a field trip around children's local 13<sup>th</sup> century Norman walled town (Fig. 6.23). The town has several extant sites and monuments that together form a fine example of a medieval town. These include a castle, town walls, towers and one gate (known locally as 'The Arch'), a Dominican Priory (known locally as 'The Abbey'), church and graveyard, a market cross and moat. Similar to school 2.3 this field trip was designed to develop place awareness in children.



Figure 6-23 DC2 S2.4 Field Trip

Before the children left for the field trip, I arranged a short trip to the local heritage centre. There the children could see the town seal and mace, replicas of weapons, Norman armour and medieval town life artefacts. Because my primary degree is in archaeology I am very familiar with the town, therefore I led the guided field trip to the various sites. The children were given a treasure hunt to look for items at the various sites. They also had iPads and small handheld cameras to collect footage for their stories. After the morning trip, the afternoon session was held back at the school. In a design change from DC1 the class did a quick exercise using post-it notes to explore what they enjoyed about field

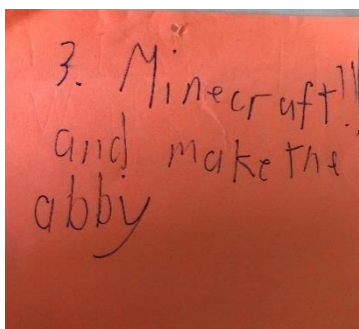


Figure 6-24 DC2 S2.4 How do you want to make your story?

trip and what they learnt. A third post-it asked them what they might like to use the following day to do their stories (Fig. 6.24). There was a mixture of Comic Life, Slideshow (Animoto) but 60% said Minecraft. Another design change involved talking them through making their first comic together, using 4 photos they collected on their field trip. The previous school teacher (S2.3) had suggested limiting the amount of images they take while on the trip. Children figured out how to use the iPads very quickly and they all created

and presented a finished comic on the first day. As children were exploring the iPads as they worked some children had defaulted to Minecraft, as it was included in the folder of apps. The teacher pointed out to the boys that there would be some time for Minecraft the following day but it would then be parked and all would move on to comics and iMovies. I explained about using Minecraft and how we

would be using creative mode to build our story, how we would screenshot what is built and then incorporate into stories. I explained about the planning the story and handed out storyboards to complete at home. Others were curious about the team groupings which the teacher designated on Day two although I had discussed with the teacher about letting children choose groupings themselves.



Figure 6-25 DC2 S2.4 Data Capture and Classroom Set-up

#### 6.3.1.2 Day two

Day two was held in the school from 9.30 to 3.00 p.m. (Fig. 6.25). The timetable included planned time for writing the story, doing a trial version of iMovie, sharing ongoing processes and constructing their digital artefact which were shared with the class at the end of the day. Post-questionnaires and the Fun Toolkit were completed by children on the day and reflection journals were handed out for completion at home. A follow up focus groups with seven participants was held in June 2017.

In the morning the teacher stressed the importance of including subject matter (history/heritage) content in their work rather than something humorous as was in some comics the previous day. I introduce a shortened version of the brainstorming activity 'What if?' again and hand out post-it notes to children. I give example of previous day where one team did their comic on 'What if the stones could talk in the Abbey?' This exercise was to try to spark their imaginations and encourage creative flow in their story making. If time permitted and they were stuck for ideas I suggested taking a 'What If?' off the notice board and making a story with it. iPads were not handed out until the story was planned and shared with the class. This was followed by free digital play time, which was followed by sharing session of working processes. The children building with Minecraft and the teacher discussed setting goals on how Minecraft would be integrated into a final comic or movie. This was followed by a quick iMovie exercise similar to the Comic Life exercise day previously, to introduce the app. After the iMovie session children shared their work with the class. During the day, regular sharing of ideas for their stories was carried out. At the end of day two, children shared their artefacts with the class, two teachers and the visiting researchers.

### 6.3.2 Findings

#### 6.3.2.1. Materiality

Children were given small handheld recorders on the physical tour of town's sites. This poem is verbatim extracts from those recordings supplemented with comments from their reflection journals (Fig. 6.26). The data shows positive affect with heritage, displaying excitement, wonder, and curiosity. It also evidences their perspective on it being a fun way to learn.

##### ***A funner way to learn***

*I loved going around seeing all the heritage  
checking out the castle  
the arch  
the abbey  
and the market cross*

*The walk was my favourite  
it was the hardest  
walking around my legs were sore  
going up the stairs  
visiting the castle...  
I'm scared of heights*

*The castle is my favourite part  
I found it very interesting  
the history inside it,  
I loved the method of reading the gravestones*

*What I would like...  
if we were allowed to go into the castle:-  
watch the video,  
make a movie  
sort of based on that*

*We didn't actually get to touch the heritage centre  
things...  
like imagine  
if we got to actually wear the chain mail armour=  
=yeah, that would be good  
that would be class*

*Or climb all the towers,  
that would be good  
Yeah that would be good  
like if you climbed one of the towers  
you could look down and have  
a proper view of that tower  
sorta a birds view of everything*

*it was really fun  
I learnt a lot of history  
it was just really exciting*

*a funner way of learning...  
I think*

Figure 6-26 DC2 S2.4 Materiality -Poem – A funner way to learn

In the questionnaire on favourite activity, ten out of 19 UOMs favoured heritage. When asked what was the hardest part three children (out of 16 UOMs) found the field trip challenging:

"learning history and playing the iPads"	(child S2.4)
"The castle is my favourite part"	(child S2.4)
"I know the walk was my favourite and it was the hardest"	(child S2.4)

When asked in the reflection journals what did they learn the children stated they learnt about their town and Irish history (Table 6.6). Of the 35 UOMs 24 related to history and the town.

Table 6-6 DC2 S2.4 Questionnaire - What did you learn during the project?

Technology	History	About the town
11	7	17
"I learned about Irish history. I learned more about technology and how to use it. I learned more about weapons to. I love weapons."		(child S2.4)
"that the Normans put two irish heads on poals"		(child S2.4)

#### Visual Data Findings - Drawings

There were 49 drawings on the reflection journals from S2.4 (Appendix Z), 13 of which are associated



with technology alone (27%). Six image include heritage and technology together (12%). With 61% of the children's drawings relating to heritage alone, it can be inferred there is a stronger interest in heritage than technology.

Figure 6-27 DC2 S2.4 Heritage AND Technology in children's drawings

In the VAS statements in the Questionnaire (Appendix F) when asked if *History is boring* the pre and post responses remained the same, 95% (N=20) disagreed with the statement. Heritage became more interesting for one child, making that an almost full class positive response to heritage being interesting (N=20). A similar response to the statements '*I enjoy learning history*' and *I like exploring history and heritage in different ways*' shows that 21 children enjoy learning history and exploring it in different ways, an increase of 1 child from the beginning of the intervention. This school appears to have had a high level of interest in heritage prior to the intervention.



In the intervening time between the intervention and the focus groups some boys had climbed the towers on the town wall circuit. The boys had created a desire to climb the towers and the castle during the project as per poem (Fig. 6.26).

[00:01:39] It was ama::zing view  
 [00:01:39] you could see the whole [of [Town 2]  
 [00:01:40] [there's a stairs you can go up and then there was just the top and it had no fences like on it  
 [00:01:51] Child: you ↑ could see the sch::ool  
 [00:01:52]: they put a gate there that way people couldn't get through so they forgot a bar so  
 [00:01:58] we were able to fit through

6.3.2.2. Digital augmentation

Digital Augmentation - Minecraft Story building	
	<p>Arguments began over Minecraft and others invading each other's worlds. After the arguments about who's in whose worlds, one boy takes the lead. He invited others to join forces and collaborate in one world (rather than previous individual worlds). John can be heard saying 'you guys do the Abbey', and they decided amongst themselves who was building what and they set goals to complete the digital artefact. They communicated through internal messaging and calling each other across the room as they worked heads down.</p>
<p style="color: red; font-weight: bold;">Groups joining up - self-directed</p> 	
	<p>Boy: We're trying to build this tower              Boy: We're nearly done, I've got the wall done              John: Hey guys you should all have your own skins and then we can=              Boy: =Leo, the wall is officially done              Leo: Everybody get that?              John: (shouts) We got it Leo [I presume this means an internal message]              2:10:48 John: And make sure it's at the outside of the wall              Boy :((inaudible)) and the () is outside the wall with the Irish              2:10:54 Boy: No, they're inside the wall              2:11:06 Boy: Can you build them like this...everybody come to me and build them like this....              Boy: one second, me and Keith are building towers              Keith: I'm building the () tower              2:11:11 Leo: Everybody come to me (nobody comes- all in their own individual flow)              2:11:22 Everybody come to me and=              Boy: =I know, I'm coming in a minute</p>
	

Figure 6-28 DC2 S2.4 Vignette 14 - Digital Story building- Minecraft

During the story planning session, evidence was found, when using Minecraft, for planning by discussion rather than writing down a plan on a template. In the team that instigated collaboration amongst everyone at the storyboard planning phase. It was the details they were interested in not the story. For example, John says he's *'building the wall'*. Gavan says *'if we've time well build a few huts'*, they talk about villagers and talk about the type of wood they will use. *'Oak'*, one boy says. Another says *'no maybe dark oak'* which they agree on. The wall is next. *'That will be sandstone'* John says and *'the floor should be gravel'*. They plan a banquet, banners, tables and shields. They talk about the ceiling and the walls and how the floor will require a different layer. Keith says *'I can't wait 'til I get to the Minecraft'*. At the same time the teacher is talking about the hard work now required for planning the story and must be planned well for a good digital artefact. What was important to these boys though was the detail in the building of Minecraft.



Figure 6-29 DC2 S2.4 Vignette 15- Minecraft details in local sites

Planning a story proved a challenge for engaging children with heritage. One boy can be heard say *"I'm not putting any effort into this"* and *"I don't care about it"*. One of the boys in the above vignette (14) argued there is no need for storyboards when building in Minecraft. One example detailed below from the audio data shows children's reluctance to fill in storyboards:



## Chapter Six Design Cycle Two

<p><b>Storyboarding</b></p> <p>Boy: What I really want to do is make a Minecraft castle, me and my group, we're going to do that"</p> <p>RA [Research Assistant]: why don't you create a story about the Minecraft castle?</p> <p>B: It's going to be a tour of it</p> <p>RA: but what would you see on the tour</p> <p>B: we've it all planned out...we've it already planned out</p> <p>RA: that's great, but maybe you can fill that in to show us</p> <p>B: I don't want to...I don't want to</p> <p>Boy Shows RA the storyboard template and says there's no words in Minecraft as MC 'doesn't have any speaking'</p> <p>RA: well you could maybe draw the images in it</p> <p>Boy: Like walking up to the castle?</p> <p>RA: Great</p>	
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Figure 6-30 DC2 S2.4 Vignette 16 -One boy's storyboard process

When asked what was their favourite activity heritage was preferred according to the reflection journals. Out of 19 UOMs, nine were related to technology. These were broken down further as iPads (N=4) Minecraft (N=2) and iMovies (N=2) and Taking Pictures (N=1). Nine children out of 16 found figuring out the technology (Movies and Minecraft) as being the hardest part of the project.

"building the minecraft server and building the castle, abbey and the arch"	(child S2.4)
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When asked in the reflection journals what did they learn the children eleven UOMs related to technology (making movies and comics), but not as much as heritage where there was 24/35 UOMS.

Technology	History	About the town
11	7	17

### Digital Augmentation of Heritage

In the focus groups, one boy stated *Minecraft* was good for showing people the town 'instead of them imagining in their head if they never like heard of [town 2] they could actually see what it looks like'. Two boys said they were now building 'heritage' with two friends at home. They confirmed this was a development of the project, one saying the project gave him an interest and another saying he already had an interest in heritage but '*this kinda it gave me more of an interest that I'd like to do it more*'. They explained about intricate building in *Minecraft* which was not visible on the video data '*we did this bit with the Arch is like there's a piston and then when you like... someone stood up at the top when you pulled the (sleeve) water would flow down and when you pulled it again water would stop*'. One boy commented how '*i thought i'd never play Minecraft in school so it was very fun that we got*

to'. Another suggested to the teacher that they should install *Minecraft* on some of the computers in the school library.

Role of technology in heritage learning

When asked whether technology helped them with their heritage learning, 'a bit of both' was the first response. The boys stated technology can help you but you can do without it, it is '*only loads of peoples different information*' and '*you could always use like Lego to do that Minecraft thing*'. Another boy commented it is '*kinda bad for you in a way but its good to help learning as well*'. Another did not like how it caused arguments. However, three boys had downloaded Comic Life at home and others mentioned above were building with *Minecraft*. They mentioned they would not have used these apps. only they learned how to use them in the intervention. One boy said only reason he knew of iMovie was that it came with the iPad. Others did not know these apps. existed. Technology can be a distraction the boys stated. While on their field-trip because they had the iPads they '*missed things*'. One boy stated ten people passed a clay tile that he noticed "*ten people passed that clay pot thing on the stone and they were all on the tablets and I was the only one with my tablet down and I noticed it.*"

The two statements regarding technology and heritage (a) *Heritage is more interesting when using computers* and (b) *Technology makes learning history and heritage more interesting* produced an increase in agreement with these statements at end of intervention. 8 children more agreed with statement (a) at the end of the intervention from N= 6 to N=14 (64%), and there was an increase of 7 children agreeing with statement (b), from N= 9 to N=16 (73%). There were decreases in disagreeing with the statements, a reduction of 8 children for statement (a) (from N=12 to N=4) and 5 children for statement (b) (From N=9 to N=4). 4 children are unsure about statement (a) and 2 children are unsure about statement (b). The majority of the children find computers increases interest in heritage, and technology makes learning in the classroom more interesting.



Engagement		
		<p>Keith was very keen to use Minecraft and he included it in his comic. After he presented teacher mentioned our time constraints. The boy was keen to show his movie also, and was saying '<i>it's only a trailer</i>' '<i>it's only a trailer</i>' but we had to move on. He asks teacher '<i>Please can I show?</i>' Teacher states we have to move on and he replies '<i>Ah</i>' in a sorrowful tone.</p>

Figure 6-31 DC2 S2.4 Vignette 17 Engagement

6.3.2.3. Engagement

Not every child was engaged all of the time. The video shows some children messing while others had heads down and not concentrating on finishing their piece. Yet when some of the children had clear intentions of what they wanted to do, they were clearly focused and in flow.


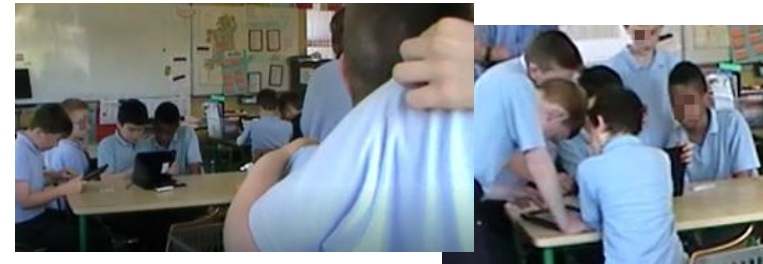
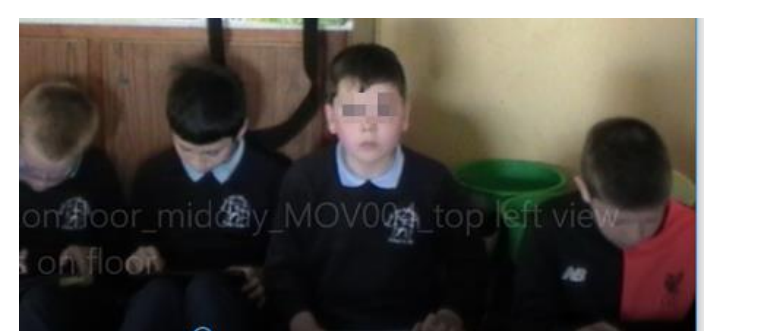
Engagement – Flow and Focus	
	<p>Other teams worked away (while others were presenting), trying to get theirs ready to present to peers</p>
	<p>Even as others were messing in front of the camera, others kept on with their goal of finishing their project</p>
	<p>When boys were sitting on the floor working collaboratively on their worlds others were messing around them taking pictures of them with the small handheld cameras. They did not look up at all.</p>
	<p>Teacher makes announcement about Minecraft causing the school system to slow down in other classes and tells children they have only few minutes left and he will turn Wi-Fi off then. One boy suddenly looks up horrified. They keep working away, their fingers flying on the iPad. As teacher goes around telling them to stop he says 'Sir, I'm just taking screenshots so he isn't interrupted.</p>

Figure 6-32 DC2 S2.4 Vignette 18 - Flow

The teacher had to tell children several times to go outside for their lunch but they were keen to work through.

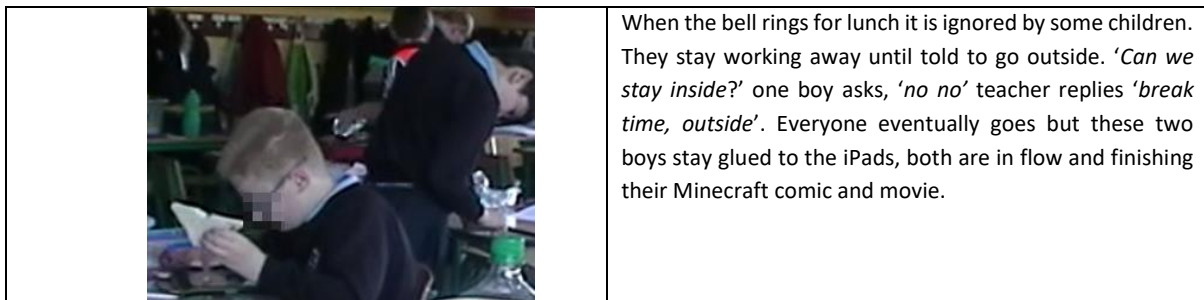


Figure 6-33 DC2 S2.4 Vignette 19- Flow

#### 6.3.2.4. Sociality

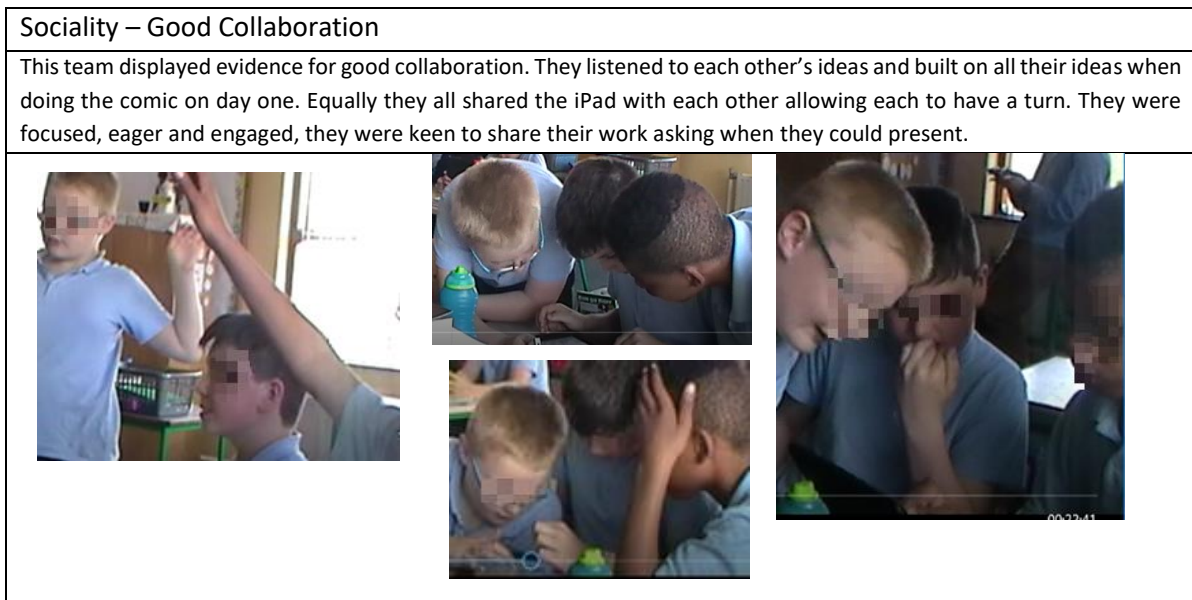


Figure 6-34 DC2 S2.4 Vignette 20- Sociality

From the focus groups it was found when it was quicker working in teams through 'working together and sharing information', there were more 'ideas in the group', and it helped one boy 'learn easier'. "we would never have gotten say Minecraft finished if we weren't working in teams" with one boy stating that the work the group did together would have taken two or three days on their own. Two other boys said they would not have got the castle done only they were working together. The boys were able to organise their time in Minecraft and to finish more quickly they 'checked just with the team to see would that be good or would that take up too much time.'

## Chapter Six Design Cycle Two

Children were happy they could collaborate with another team when building the town and liked 'setting up our own teams' although there were challenges. When asked why team work does not work, the boys stated not everyone gets along, one person is hogging the iPad, or doing it by themselves, different ideas and differences, disagreements, not being open minded or making decisions together, or voting on things. They agreed this was better than 'someone saying do this and they mightn't like it', that within a team there is freedom. Within their Minecraft building of the town, they switched around roles. They organised between themselves 'Leo was building the castle and then I built the rest of it then he moved on to something else to get it done'. This following transcription piece from the focus group highlights the tensions involved:

[00:24:45] Conor: I only think there was one bad thing with the technology it was ruined arguing over-  
[00:24:50] John: that was mostly your group and Chris's group  
[00:24:54] [Yeah Chris's group was screaming  
[00:24:54] [Conor: Yeah Chris's group  
[00:24:54] Sean?: Yeah Chris was screaming on me just cos I started on the walls  
[00:24:58] John: @Geo::rge↑  
[00:24:59] George: No I didn't scream...he left  
[00:25:02] No Chris..Chris started....you started making the tower when we weren't done with the castle so I was like ↑ Sean↑ what are you doing↑  
[00:25:10] Sean: ((softly)) we finished the outside cos we weren't like-  
[00:25:13] : Sean are you the one that kicked @me out  
[00:25:14] ?: ye::ah ↓ ((giggle))  
[00:25:15] Sean: I didn't kick you out  
[00:25:14] ?: yeah  
[00:25:15] Sean: I didn't kick you out  
[00:25:16] ?: I came over cos it wasn't my turn and said [can I help you and you said] go away  
[00:25:18] ?: [↑you see this is what i mean]  
[00:25:19] Sean: Me::↑  
[00:25:20] ?: ye::ah↓  
[00:25:20] Teacher: This is healthy, we're discussing  
((loads of voices together inaudible))  
[00:25:24] John: This is funny  
((inaudible voice together))

When asked what would stop the arguments in Minecraft the responses included 'talk', 'proper discussion', self-selection of teams, and voting within a team to agree on building.



6.3.2.5. Playful learning

Every child was involved in playful learning even if it was not through computer technology. Five boys



moved from their teams to build with Lego, where they made a replica of elements of the castle like the Guarderobe (an outside toilet) and imagined medieval life as in the banquet for two chieftains in this image (Fig. 6.35).

Figure 6-35 DC2 S2.4 LEGO - Banquet at the castle –Photo credit: T.Hall

Fig. 6.36 shows evidence for creative learning and imagination when one team used a ‘What-if’ post-



it to make a comic about the stones at the Abbey speaking. Creative learning was fostered in this playful learning environment which afforded the conditions for flow as evident in previous vignettes.

Figure 6-36 DC2 S2.4 Creative learning

Positive affect

The most reason children enjoyed the project was related to positive affect, enjoyment and fun.

They enjoyed learning the history of their town and the physical aspect of the field trip:

“yes we went outdoors, indoors and it was just plain fun”	(child S2.4)
“I did the photos and all the work I really enjoyed”	(child S2.4)

Of the 27 UOMs to this question, coded inductively, 13 UOMs related to positive affect (Table 6.7).

Table 6-7 DC2 S2.4 Questionnaire Did you enjoy the project? Why? Why not?

Positive Affect- Fun exciting	Learning	Physical aspect – Going around the town	Technology
13	5	4	5

Freedom and fun

All agreed they would do the project again and it was ‘pretty fun’. When asked what does fun mean, their responses included not doing schoolwork, playing with Minecraft, enjoying what they are doing, exploring and ‘just roaming around’. The freedom to walk wherever they wanted ‘and we weren’t really really restricted’ was echoed by all the boys. Having the freedom allowed ‘to take the pictures we wanted’. It transpired although they had visited the Abbey twice previously from school they had

not been able *'to roam around it'*. Only one of the seven boys had been inside the Abbey previously even though it is located next to the school.

#### Narrative

The hardest part for four children in the reflection journals was the story writing. On asking about story writing one boy who was part of the team building the town in Minecraft did not connect making a movie with planning a story *'we didn't even make a story we were making a movie'*. One boy suggested focusing *'a bit more on the sheets'* so as when given the iPads children would know exactly what to do. Another boy stated they took the best bits from the story boards and tried to put their ideas together which they stated worked out *'pretty well.'* From the focus groups on the process of sharing works in progress as they went along the boys liked to see what others were doing, liked presenting and sharing their ideas.

#### 6.3.2.6. *Learningful play*

The following vignette (21) shows the resulted artefact of a learningful play process that combined heritage interaction, engagement, digital augmentation, collaboration and playful learning. This was the result of a free and structured play involving Minecraft, where children self-directed their learning, willingly collaborated, had clear rules and goals in making their artefacts. They were engaged in flow experiences while using the technology, all while interacting with the local heritage of their town. The factual information built into the imaginative constructing of the medieval town can be noted in the following vignette.

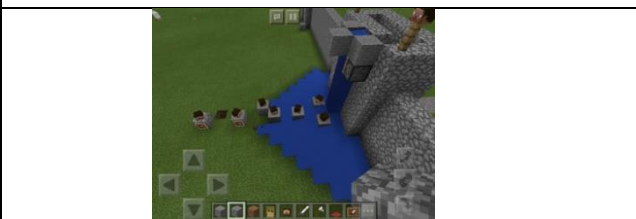

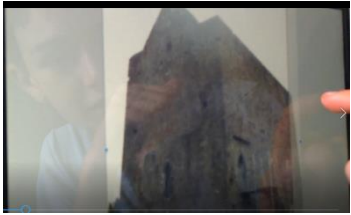



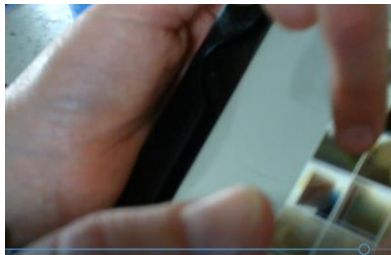
Learningful Play	
	<p>The detail this group showed in their iMovie using Minecraft screenshots show what they learned on the field trip the previous day, including the two heads of the Gaelic chieftains on the town wall. “See” one of them calls out as everyone watching the movie “<i>the two heads on the poles</i>”. Teacher comments ‘<i>oh there’s the priory</i>’ – “<i>I made it</i>” pipes up one child. The priory’s 14<sup>th</sup> Century eastern window was detailed as well as towers, the Priory, the wooden staircase on the castle and the moat around the castle. Teacher comments ‘<i>Oh there’s the Cavalry</i>’, and a child replies ‘<i>I made it.</i>’</p>
	<p>When the Priory came on screen, one boy say to another in an excited tone ‘<i>god ye did the graves and everything</i>’.</p> <p>Minecraft was very detailed in some parts in for example the Eastern window in the Abbey/Priory.</p>
	<p>Their Minecraft iMovie showed evidence of engagement in the fine detail and pride they showed when presenting it. The facts of the town were written in the pop-up text.</p> <p>This team worked collaboratively. There was evidence of others joining in and leaving the game (name comes up at screen top). The video lasted for 4 minutes 10 seconds. The teams got a big clap from everyone. This video satisfied the teachers request for historical facts as well as displaying evidence for children’s creative imaginative interpretations.</p>
	

Figure 6-37 DC2 S2.4 Vignette 21- Learningful Play

The following vignette (22) also shows an example of learningful play; the learning is playful, social, creative and engaging. Engagement indicators such as interest, pride, focus and flow can be identified as Conor and his team make their first comic. They show persistence and adaptability in quickly reiterating their design while under time pressure. Whereas the challenge is difficult, it is not beyond their capabilities and they manage to produce a quality comic in the end. Furthermore, this team showed evidence of Resnick’s (2007a) creative learning process, where they imagined, created, played around with their story, collaborated and shared, and modified their story building on the ideas of others which led to a re-imaginings of their own story.



<p><b>Learningful Play</b></p> <p>Conor, James and Robert are working together on showing their comic story. Robert films the entire process of comic making for 22.25 minutes. Conor asks <i>“Robert will you hold this up to the screen to make sure it can be seen.”</i></p>	
<p>This is the team’s first attempt at making a comic. They are seen trying to import and resize images in Comic Life app. Conor is talking through his process <i>“We’re making this here...”</i> but he is trying to figure how to do it. After 30 seconds of focus he gets frustrated, saying <i>‘this is turning out horrible and puts his hands to his head.’</i></p>	
<p>Conor keeps trying and they have another setback where his team mate Robert advises him to You Tube it. However, Conor persists adding captions and text to his images. At nearly 9 minutes into the making session another boy from another team enquires what they are doing. Conor replies in a frustrated tone <i>“I don’t know, this is so hard to use”</i>. As Robert continues filming the process Conor mentions how he has <i>“no clue how to get out of this”</i>. However, 9.25 into the session he figures it out and exclaims excitedly <i>“Ah Yay. Now we need to get out of this and...where do we need to go. Oh yeah, my comics...”</i> where he proceeds to choose his template. Although Robert is involved as the filmmaker James does not appear to be included in any decisions in making the comic.</p>	
<p>Sharing of presentations is now taking place in the classroom yet Conor continues on the iPad, both he and Robert who is filming are whispering together. As the first team present, Conor has finished the titles and subtitles. He momentarily turns around to see another team present their comic on the whiteboard. Once he sees their presentation he immediately goes back into templates and says to Robert <i>“we’re changing this”</i> scrolls down through all the templates and then chooses a colourful one like he just saw in presentation.</p>	
<p>Conor and Robert continue through 3 more presentations, having a discussion in between about dates for the building of the Abbey and the Castle. Another assistant teacher comes around and chats to Conor about their comic. They have a quick discussion of what he wants the comic to be about; <i>‘the heritage of [town 2]’</i>. They want to put in the town wall gate (the Arch) but they realise they did not take picture of it, teacher suggests going to the library for a picture, another two boys suggest alternatives. Conor scrolls down through pictures their team took throughout the day and together they select one.</p>	

Chapter Six Design Cycle Two

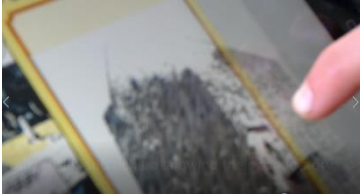




<p>Teacher asks for quiet again for the 4<sup>th</sup> presentation to take place which is funny, boys are laughing and it gets applause at the end. Conor looks up momentarily, laughs too and then turns around back to finishing the comic. Robert is constantly filming the iPad. Teacher asks Conor is he ready to present and he says 'Not yet' 22.15 minutes have passed since they first started figuring out the comic.</p>	
<p>Boys can be seen at bottom- left with heads down as other presentations held at classroom board</p>	
<p>The team managed to get comic done just in time and presented last to the class even though children were getting ready to go home. The team stood together and shared the reading of the comic out aloud of the comic.</p>	
<p>As the boys leave to go home, they are chatting beside one of the main classroom cameras. They notice it recording and Conor puts his thumb up and says 'Hi I had a really good time today'</p>	
<p>The next day, the boys furthered developed their artefact while exploring iMovie, adding music and sounds to the existing comic.</p>	

Figure 6-38 DC2 S2.4 Vignette 22 Learningful Play

6.3.2.7. Fun toolkit

In S2.4 the top two favourite activities in the Fun Sorter (Table 6.8) show *Learning about my place* (N=9) and *Using iPads* (N=7). This was triangulated in The Again-Again table (Table 6.9) where 22 children said they would like to *Visit my town and learn about my place* and 21 children saying YES to *Use technology (example iPads, tablets) for learning*. Similar to S2.3 *Using iPads* and *Learning about my place* are the two most favourite activities and what they would like to do again. What is least liked ties in with the previous school and DC1 – ‘*Thinking of and Writing the Story*’. This triangulates with video data and reflection journals where story writing was found to be difficult. Whereas in the Again-Again table, 12 (55%) said they would write a script again, the highest amount of NO’s was recorded for this activity (N=7). ‘*Working with teams*’ was not an issue as per S2.3. 17 said YES, they would work in teams again.

Table 6-8 DC2 S2.4 Ranking of Fun Sorter Activities (1-9)

Ranking of Activities	rank	Per cent	Number One Activity	Number One and Two Activities (Combined)	Per cent
School 3 (n=22)	1	23%	Using iPads (n=5)	Learning about my place (n=9)	41%
	1	23%	Learning outside school (n=5)		
	2	18%	Learning about my place (n=4)	using iPads (n=7)	32%
	2			Learning outside school (n=7)	32%
	9	36%	Thinking of and writing the story (n=8)	[Number 9 and 8 ranking combined] Thinking of and writing the story (n=12)	55%

\*Green – 1<sup>st</sup> ranked choice, Blue 2<sup>nd</sup> ranked choice

Table 6-9 DC2 S2.4 Again-Again Table

Ranking of Activities – Again-Again Table	N=		
School 3 (n=22)	YES	NO	MAYBE
<i>Visit my town and learn about my place</i>	22	0	0
<i>Use technology (example iPads, tablets) for learning</i>	21	0	1
<i>Learning in a different place form school (example heritage center, castle)</i>	21	1	0
<i>Use Apps for History Class</i>	20	0	2
<i>Making a digital story</i>	19	0	3
<i>Work together on teams</i>	17	2	3
<i>Taking photos</i>	17	2	3
<i>Search for information on your story</i>	16	1	5
<i>Write a script</i>	12	7	3

\*Green – 1<sup>st</sup> ranked choice, Blue 2<sup>nd</sup> ranked choice, Orange 3<sup>rd</sup> ranked choice

### 6.3.3 Summary of findings

The findings indicate children enjoyed the physical side of the heritage learning experience the most. Drawings indicate their engagement with heritage and there were more positive affect associations with heritage than with technology. The field trip was their favourite, it was a fun way of learning and they enjoyed the freedom to roam, although some boys found it challenging. Although children pointed to how technology can be a distraction and how technology does not necessarily enhance heritage learning or engagement, they enjoyed how technology afforded them choice in learning the way they wanted. Children liked using iPads, being out of school and learning about their place. Enjoyment of technology was related to mainly Minecraft and making iMovies, although it was challenging figuring out both apps. While children learned about technology they learned more about local history. There was no change in history becoming less boring as there was a high existing interest in history and heritage (95%) in this school. Children liked exploring history and heritage in different ways, their interest increased post-intervention in using apps and technology to engage further with heritage. Equally physical engagement with place increased as evident when some children returned post-intervention to climb the towers. There was evidence of focus and flow in the classroom. Children showed pride, focus, flow, persistence when frustrated, and adaptability by quickly iterating their artefacts designs. Arguments over Minecraft were similar to previous school (S2.3). However the boys overcame the difficulties themselves. They self-organised and self-directed their own learning, setting goals for the building of the town. In teams they realised the value in collaborating and they liked being self-directed. Free digital play afforded them opportunities for self-directed learning and collaboration. Story writing was challenging for the children and getting stories down on paper. *'Thinking of and writing the story'* was the lowest ranked enjoyable activity. Children preferred an 'oral' story plan, especially when using Minecraft. Children's interest in planning was in the detail of the making. All children evidenced heritage engagement through the use of technology. Learningful heritage play was present in this data.

### 6.3.4 Design changes resulting from S2.4 intervention

The teacher from S2.4 mentioned afterwards if doing the project again they would do more preparation on local history and the Normans so as to be more prepared. Therefore, I spoke with the teacher of the following school who agreed on some preparatory work ahead of our visit. Another design change going forward to S2.5 would be the use of post-it notes for stories. In S2.4 one team's members were evidenced moving post-it notes around their desk and getting more to grips with the story than through writing it on a storyboard. Evolving design changes are listed in Table 6.10.

## Chapter Six Design Cycle Two

Table 6-10 DC2 Evolving design changes - School 2.4 to 2.5

Design changes from School 2.4 to 2.5	
Brainstorm individual stories to hone team ideas before the field trip	'What If' exercise not continued
During team storyboarding time, each team member to get timed uninterrupted chance to tell their story to team members.	Post-It notes for storyboarding within groups

6.4 School 2.5







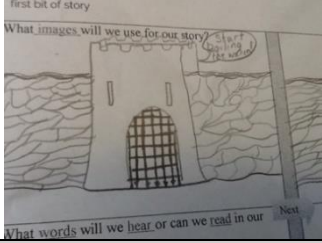



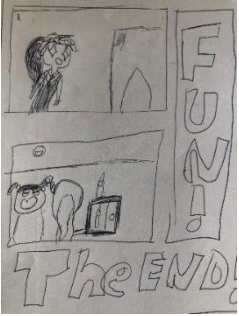
DC2: S2.5		Overview and Methodologies	
Pre-Visit April 2017		Explaining the project and completion of pre-questionnaire	
<p><b>Day One: 29<sup>th</sup> May 2017</b></p> <p><b>Present: Sally, Fiona, Damhnait, Matt and teacher</b></p>			
(a) Local Trip		(a) Activity Sheets	
		  	
(b) School classroom		(b) Video and audio recordings	
		<p>Storytelling strategies: -Preparation of Story making ideas done in advance by teacher - Post-It Notes for amalgamating individual stories - Storyboards to bring home day one – Timed individual telling of children’s ideas to group on day two</p>	
		 	
<p><b>Day Two: 30<sup>th</sup> May 2017</b></p> <p><b>Present: Sally, Fiona, Damhnait, Matt and teacher</b></p>			
Day Two:		Video and audio recordings	
(a) developing and sharing story ideas		Post-questionnaire	
(b) constructing and presenting digital artefacts		Fun Toolkit	
		Reflection journals (for completion at home)	
			
		 	

Figure 6-39 DC2 S2.5 Overview



### 6.4.1 Two-Day Overview

#### 6.4.1.1 Day one

This school (S2.5), with 30 female pupils was based in the same town as S2.4. Therefore, the activities and the sites visited were the same except for the heritage centre visit which was unavailable (Fig. 6.39). For this school I had help from three research assistants on day one and one assistant on day two. Similar to the boy's school, after the field trip children made a comic together and shared with class before end of day. The teacher had given children homework in writing stories so children had already prepared individual stories. The teacher had organised teams by 'themes' of their writings. During day one children brainstormed their individual stories to try get a team idea before, not after the trip. Therefore, first thing in the morning they shared their individual work/stories to their team, and decided what their joint story may be so as when on the field trip, they had clear goals on what they are looking for, in terms of focusing on photos needed and the gathering of more information. Another design change implemented to improve the story making process was that each child was given allocated uninterrupted time to share their story with other team members. Child 1 spoke for three minutes, then Child 2 etc. This was to ensure everyone's voice was heard and included in the brainstorming of group stories. Additionally, unlike the last two schools the girls did not have small handheld cameras going with them on their field trip, and although this allowed clearer focus on the story, to an extent it took away some of the fun and light-heartedness as well as potential valuable data on their perspectives, similar to the last two schools. Research assistants collected data from the small handheld recorders on the field trip.

#### 6.4.1.2 Day two

Day two was held in the school from 9.30 to 3.00 p.m. (Fig. 6.40). The session involved planned time for writing the story, doing a trial version of iMovie, sharing ongoing processes and constructing their digital artefact which were shared with the class and the school principal at the end of the day. Post-questionnaires and the Fun Toolkit were completed by children on the day with reflection journals handed out for completion at home. Two follow up focus groups with twelve participants were held in June 2017.



Figure 6-40 DC2 S2.5 Classroom and Data Capture Set up

6.4.2 Findings

6.4.2.1. Materiality

The following vignette (23) shows evidence of a personal connection for one of the children to place.



Making Personal Connections to Place	
<p><i>Kate is reading a wall plaque out loud and makes a personal connection to the person named. She gets excited:</i>                      [00:13:33] Kate: ↑Oh my daddy's name is John and my mom's maiden name is B...</p>	
<p><i>She is eager to write the inscription down</i>                      [00:12:57] Oh ↑look we got some English ((pointing at a wall plaque))                      [00:13:00] Ok::ay Here is body of Sir John...here squat down squat down ((girl bends over and Kate uses her back as a support to write on))                      [00:13:28] Kate: Body of Sir John.. oh genie</p>	
<p><i>She continues reading the inscription and writing at the same time</i>                      [00:15:10] Jennifer: ((finishes of the reading)) the Baroness of [Town 2] in 1683..seriously guys                      [00:15:27] Kate: Oh my God ↑that's crazy my granny's name is M... B... and she used to live in [Town 2].. genie macks                      [00:15:34] Kate: Anyway M... B...                      [00:15:38] Aisling : ((laughing)) I'd prefer if you didn't write the rest ( ) [Aisling is 2.41 minutes bent over as Kate writes on her back]                      [00:15:41] Kate: M... B...Ok I'll write the rest on the wall</p>	
	

Figure 6-41 DC2 S2.5 Vignette 23 Materiality - Making personal connections to place

These girls display evidence for imaginative story-telling and for engagement later on the field trip.

			<p>Alice's team select a medieval name and write a fictitious story. They go on their field trip and find their 'story is real' – there is a Lady Mathilda buried in the Abbey. Here Alice taps the centre of the tale to emphasise to others writing that Mathilda should have red hair 'because she's Irish'</p>
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Field trip

When asked in the focus groups what children enjoyed, they enjoyed having no schoolwork, loved making the movies and the field trip. History is one child’s favourite subject and they *‘don’t get to do it that much’*. One child said she was not too fond of history but she liked the field trip and it is much easier and more interesting than learning it from a school book. *‘Teachers keep droning on and it gets really kind of annoying’* which is *‘kinda like boring’*.

When asked ‘What did you learn during the project?’ it was found children learned the factual information about their town (N=18), about the different sites i.e. castle, walls, arch, moat (N=16), and about the town itself (N=15)(Table 6.11). Children learnt about technology (N=8) and one child learnt how to work in a group. There were 58 UOMs from 30 children. Children’s verbatim data when put into free verse below highlights the evidence of more engagement with materiality than with technology.

Table 6-11 DC2 S2.5 Questionnaire - What did you learn during the project?

History facts	Specific sites	About the town	Technology	Work in Groups
18	16	15	8	1

**I learnt**

*everything thing I seen  
all about the town  
that I live in  
a lot of facts that I never knew before,  
when the town was founded,  
there was a moat around [Town 2].*

*I learnt about the wall  
the murder hole in the arch  
theres more of the wall standing than I knew  
built around Thirteen Ten*

*I learned all about King John’s castle  
built in three stages  
the casel is 800 hunderit year's old  
the De Berminghams  
lived there*

*I learned about technology,  
it is really fun  
making comics and movies  
and learning  
about [Town 2].*

*I learned so much about [Town 2]  
that I couldn't fit it on these lines.*

In the VAS statements in the Questionnaire (Appendix F) it was found 5 children found history less boring after the intervention and another 6 were unsure. 73% (N=22) disagreed with the statement 'History is boring' after the intervention. 23 children (77%) agreed post intervention that *Heritage is interesting*. There was an increase in the statement responses to 'I enjoy learning history' from 18 to 20 children (67%). 8 are unsure and 2 children do not enjoy history. There was a slight decrease (N=1) in liking exploring history and heritage differently, although overall this was a high positive number (87%) of children agreeing to the statement 'I like exploring history and heritage in different ways' (N=26). Overall a majority of children have an interest in history and heritage.

#### 6.4.2.2. Digital augmentation

There were 67 drawings on the reflection journals from the girls. 31 images are associated with only heritage (46%), 22 images only technology (33%) and 14 (21%) specifically include heritage and technology together. There is evidence of liking solely heritage, solely technology and liking both together.



Figure 6-42 DC2 S2.5 Technology AND Heritage in children's drawings

When asked in their reflection journals 'What was your favourite part of the 2 days', 24 UOMs (out of 39) related to technology (making the movies (N=14), making the comics (N=5) taking photos (N=3) and using the iPads (N=2)). 'Making' was the children's favourite activity with movies preferable than comics:

My favourite part was making the movie with my friend"	(child S2.5)
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The hardest part of the two days was the process of making (N=16 UOMs out of 32). Both movies and comics were challenging (N=9 movies, N=8 comics) with the recording part of the movie making process mentioned as hard (N=4):

"the movie we could never get the audio right "	(child S2.5)
"make the comic because you had to edit and put in photos and the wright the story and choose fount etc"	(child S2.5)
"the movie was hard because it was hard to record voices without other people talking in it"	(child S2.5)

Technology enhancing heritage learning

When asked in the focus groups whether technology helped them with their heritage learning there were mostly 'yeahs' in reply to the question. Before the project started two children were excited about using the iPads and did not think about the heritage *'but then when I did it I thought it was really really cool'* and *'when I was learning it it was actually really fun'*. Another child commented the technology *'got you more interested in the project.'* One girl said she had an iPad already and it did not help her. Five girls said the field trip was a better way of learning heritage although all said 'yeah' when I asked did making the comic and/or movie help them be better engaged with their town. One child had downloaded iMovie, one had tried and one said if she had one she would put iMovie on it. One child mentioned she was not into *'that technology'* before but is now and has the app iMovie on her phone. One child believed taking photos was a help in her learning because it helped her remember. She also made connections to the monuments through taking photos as she felt *'they were talking to you'*. Knowing their story outline before they left on the field trip and knowing which pictures to take was easier on the children.

The two statements regarding technology and heritage (a) *Heritage is more interesting when using computers* and (b) *Technology makes learning history and heritage more interesting* produced a small increase in agreement with statement (a) (N=2) and a decrease of one child for statement (b). Post intervention those agreeing with both statements were (a) N=25 (83%) and (b) N= 27 (90%). Four children had disagreed with statement (a) but reduced to two children post-intervention. Two children had disagreed with statement (b) but reduced to one child post-intervention. It can be inferred that pre and post intervention children hold a high interest in history and heritage.

6.4.2.3. Engagement

Evidence of engagement (dwell time) can be seen in the following vignette:

Engagement – Dwell time	
	<p>The tour included a visit to a 14<sup>th</sup> century Priory.</p>
	<p><i>Girls uncover written inscriptions on the medieval grave slabs and take images of the medieval grave slabs on iPads.</i></p> <p>The grave-slab is challenging to read. As the girls crowd around the slab some try to read it.                  [00:04:25] Jane: !YES !YES we got writing                  Jane: Sorry I got excited                  [00:04:32] !Oh my God                  [00:04:37] I think we need to learn Latin now</p> <p><i>Teacher encourages others to find others to try decipher themselves</i></p>
	<p>[00:04:50] Jennifer and Lily remain at this grave                  [00:06:07] L: I'm going to write it down                  Jennifer: Ok pray for the soul of ((and points to words as she reads))                  [00:09:12] Reads it aloud again. Some other girls come and help with the reading                  Lily :the soul of William and his wife Annie ((Jennifer and Lily still rubbing grave-slab))                  Child?: Anne, her name is Anne ((still trying to read))                  [00:10:17] Jennifer: so hard to read.</p>
	<p>Jennifer calls us to say 'we figured out what most of it says'</p> <p><i>Jennifer spends 00.05.52 minutes working on the Inscription</i></p>

Figure 6-43 DC2 S2.5 Vignette 24 Engagement - Dwell Time

Different forms of engagement were noted throughout the video analysis. In this vignette (25) Cara is excited telling me about trying the movie making at home before she came to school. She displays interest and positive affect towards the project. Pride is displayed many times by many of the children.


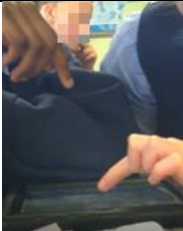
	<p>Girl B: 'I made an iMovie this morning'                  Me: Did you? Before you came in?                  Girl B: Yes she says nodding</p>
	<p>Here Eva is proud of her team's presentation of their initial comic. She says "I think we did a pretty good job" after they sat down after their comic presentation</p>

Figure 6-44 DC2 S2.5 Vignette 25 Engagement – Interest and Pride

Engagement with the story making process was evident from the focus group conversation on making the stories. One team realise how hard it was to make an animation '*Like I had to draw 150 pictures*'. Another said she likes medieval fashion and clothes. She drew all the characters in their stories as she had interest in patterns, necklaces, jewellery and hair.

During the making process children realised how long it takes to make a short movie:

*'Actually I was thinking that this is what the actual movie makers must feel like cos ours was <just like 1 minute and 30 seconds> and was thinking !Oh my gosh I'm so tired and how can they make a movie so long.'*

Children were proud of themselves when they learned how to do a movie after finding it challenging to learn. Technical challenges like lag, adding audio, having to start again added to their frustrations. After initial doubt in whether they could do it '*when we got it I was very happy*'. There was evidence from the questionnaire of engagement, dis-engagement and re-engagement:

*'At the start I was excited then making the comics were kind of hard and slightly boring but once I got the hang of it it was fun and I was proud'*

## Chapter Six Design Cycle Two

When asked about the sharing processes the children liked it '*you get really impatient cos you really want to show your own and show off... to all your friends*'. Children found it exciting and a bit anxious nervousness when presenting:

[00:15:49] Child 4: =!my movie ( ) and I was like oh my gosh we're gonna....cos (the feeling) was there and I was like ok ok ok=

[00:15:55] ((few laughs))

Child 4: =I don't think we can do this

Children were nervous they '*were going to get told off or something*' but felt proud and happy once they '*heard everyone laughing and enjoying it*'. They were nervous what their peers would think of their work but felt pride, relief and joy once they presented. One child felt '*very smart*' after it. One child who had sang in her movie was so embarrassed she hid under a table while their movie was being shown. When probed she stated she was proud to hear and see their movie. Children got ideas from others when sharing which helped their own stories. One particular example of taking ideas from others was a local ballad song that three teams included in their movies. The following transcribed passage shows how the song was important to the children. A girl new to Ireland (Child 7) heard one of the other teams singing the song and she set out to learn the song that day. During the discussion, someone commented Child 7 was out of tune, yet Child 7 had showed interest in learning and performing the song:

[00:14:30] well one group my group and Child 7's group we both sang 'the Fields of Athenry'

[00:14:39] Child 4: yeah different ways cos Child 7 doesn't really... No offence Child 7 but I don't think Child 7 really knew the tune of it

[00:14:47] Child 7: ((coughs twice)) ((she widens her eyes and stares at Child 4 ))

((someone laughs))

Child ?: but your cute singing

((rising annotations here ))

Child ?: yeah you were good

Child ?: But ( )

((other talk...inaudible))

Child ?: But you only learnt it that day

Child ?: Yeah so

Child 7: I didn't really know the words

[00:15:00] Moderator: did you sing it and you didn't know it?

Child 7: yeah

Moderator: you only learnt it that day?

Child ?: She only came this year

[00:15:04] Moderator: But you only learnt the song that day?

Child 7: Yeah!

[00:15:07] Moderator: sure that was amazing (0.2) wasn't it the way you learnt it?

((few yeahs))

[00:15:13] Moderator: Nobody would get it perfect in a day but that was fabulous, I wouldn't have thought that Child 7, that was brilliant..... Great effort

[00:15:20] Child ? I used to sing it all the time in our school ( )

[00:15:22] Moderator: Did you?

Child ? :I stopped singing it after my grandad died

6.4.2.4. *Sociality*

This transcription excerpt shows how various teams got on together. From the video and audio recordings I did not come across any arguments or heated discussions, everyone seemed to get along together. In this piece, the girls are exploring Comic Life. They negotiate as a team as they get to grips with the app:

	<p><i>This team are discussing what comic template they will choose.</i></p> <p>Girl A: Let's just pick one</p> <p>Girl B: Scroll it and then you can pick</p> <p>Girl C: Keep going, keep going</p> <p>Girl A: Let's just pick one</p> <p>Girl A: Tell me when to stop</p> <p>Girl B: If you like one you can stop</p> <p>Girl A: I'd like to get a plain one and then we could kind of make it</p> <p>Girl C: Yeah</p> <p>Girl B: I wonder can we change the background</p> <p>Girl C: I took a 151 photos</p> <p><i>The three of them discuss colours and the different options</i></p> <p>Girl A: I don't know how to do this</p> <p>Girl B: We got it, we got it</p> <p>Girl A: Trying to write the title, I'm just going to say [Town 2]</p> <p>Girl C: We're kind of getting it now.</p>
--	---

When asked how did they find working in teams the children said they like doing work on their own because of arguments and trouble agreeing with others over ideas. The Fun Toolkit had shown that six children had listed 'working with teams' as their least favourite, and only 18 would do so again (60%). However, the girls stated teams worked because of the collective ideas, rather than running out of ideas if a child is on their own. There were disagreements in making decisions which the children found challenging but eventually they worked it out through discussion '*we'd kind of half the ideas to make it into one idea*'. Children either took turns or gave themselves roles. The '*best artist would draw the pictures and am kinda then the person whose kinda good at finding information and that would find information and then the other person would then edit it.*' Time constraints was challenging and deadlines causing stress but having breaks gave them time to think and '*calm down sort of.*' When asked if they thought the project was too hard, there was a few mumbblings of 'no' with one child commenting '*none of us really struggled we all kind of helped each other.*' From their reflection journals one person's favourite activity was working with friends. Equally when asked what was the hardest one child said 'working in teams'.

6.4.2.5. Playful learning

Three short vignettes show evidence for choice, and freedom to include fun and their own interests into the more serious school subject of history. The playful environment allowed for a positive, stress-free and non-judgmental environment, where children and groups were comfortable with their experimentations and could negotiate with others in a positive way.


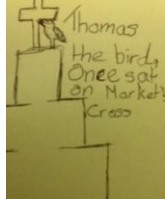
 <p>Including Emojis</p>	<p>Children when making their videos, often included emojis. Whereas this was history class in school they had the freedom to choose their own meanings on historical monuments.</p>
<p>Choice: Negotiation</p>	<p>Child A: We don't have any picture of the ...          Child B: Yeah we do          Child A: That's not good though          Child C: Yeah we don't want that          Child B: Its ok, we can google an image and screenshot it          Child A: Thanks for showing me</p>
	<p>Combining creative ideas; heritage sites as entry points to children's own interests (children had done a bird drawing class recently).</p>

Figure 6-45 DC2 S2.5 Vignette 26 - Playful Learning

Narrative

In the reflection journals when asked what was the hardest, a quarter of the UOMs (N=8 out of 32) related to story planning and getting ideas. From the focus groups it was found it was hard to agree on stories although the groups were based on themes, for example art *'then you were like basing on kinda like something'*. Most mixed their individual stories together. The strategy of each child speaking aloud their idea to the others was deemed a good way to understand others stories rather than reading their storyboard sheets. It was 'fair' and everyone got a chance to speak and no one was 'overruled'. They found it easy to bring together as they *'all had the same kind of idea'* and *'similar stories'*. However, one girl did find bringing ideas together challenging as her team had all individual ideas. The children found the strategy for bringing their individual stories together helpful by using the post-it notes:





Figure 6-46 DC2 S2.5 Post-it notes

*“what we did we got loads of the sticky note things and we put it like this section this section here we have this person and this character”*

The writing process was made easier by the use of post-it notes (Fig. 6.46) as they could be torn up and new ones done quickly rather than the traditional copybook where one might not like to cross changes out.

In the questionnaire children were asked *Did you enjoy the project? Why? Why not?* 24 children replied to this question, all enjoying the project overall (48 UOMs). The positive affect referred to multiple elements (N=48) including field trip (N=10), overall project (N=8), making movies and comics (N=7), using iPads (N=6), learning history/heritage (N=6), friends (N=4), taking pictures (N=3), homework (N=2), technology (N=1) and the story writing (N=1). The overall project, learning history/heritage in-situ, then using technology to make their interpretations was enjoyed by the children. One child said the project was *‘funner than school work’*. However, two children did not enjoy parts of the project including walking in the field trip, or being in groups. One child did not like making the iMovie:

“I enjoyed most of it but I didn’t like making the imovie. Although I learned about working together I would’ve preferred to do it alone”
“Yes I enjoyed the project because it was very interesting to know where all the historcial things are. We went in the abbey which is very hard to get into so it was very interesting to look around the Priory. I also enjoyed going into the castle and hearing all the stuff she said. 1 thing I did not like was all the walking with no water. i enjoyed the experience and hope to do it again. Thank you Sally and your team”
“yes I did. I LOVED working with electronics and joining it with the history of [town 2]”

### Creative Learning

When asked in the focus groups about ‘making’ and history, the conversation began with one child saying she prefers to read because then you can imagine and visualise it. One child said *‘I like imagining it more because then you get to imagine what its like’*. Making fostered imagination as *‘cos you got to*



Figure 6-47 DC2 S2.5 Heritage sites as harnessing children’s own interest

*bring what you thought it would have looked like into the story.’* Children liked bringing in their own creativity. One child whose imaginative digital artefact included the town market cross evidenced interest in what she had learned, she had noted another one in another county since the project which sparked her curiosity on which one was older.

6.4.2.6. Learningful play

In this vignette (27) from a desk audio tape, this team show evidence for imaginative and creative thinking and collaboration. They are playing with possibilities as they combine various elements (orally) of each other's story. They show focus as they discuss the various story outcomes and show eagerness and interest in the storyline. They set clear goals before they left for their field trip.



14.15 Girl A states "it will be easy to connect our stories", She goes on to say "I have an idea"...there is a servant who stood up to the king"...a maid and someone called William. The maid stands up to him....

*Other girls agree and continue discussing bits of stories including another girl naming the maid Lisa because it's her favourite name.*

16.14 Girl A: so we have a good general idea, so we need to tweak everything a bit

Girl B: Tweak...that's so weird ((they all laugh))

Girl C: That's very good, our story's very good.

Girl A: so let's just go over it again, so William is the leader

*Girl B says her bit, then Girl C....the story gets bits added.*

17.41 Girl A: Can we say it one more time cos you talk really fast

Girl B: you talk way faster than me

*Later they discuss and debate words, in this example they are talking about the servant.*

Girl A: His wealthy servant cos he's wealthy

Girl B: His good servant=

Girl C: =his loyal servant

Girl A: yeah that's good.

Girl B: his loyal servant... and then say the name.

*One girl sings as they work to the tune of Queen's 'We will Rock you'*

Child: 'We will, we will do this'

*The girls set clear goals going on the field trip. One girl suggested writing more of their story down.*

33.01 Girl A: We don't have to write it down. We know what we're doing, that's...that's what's important

*They agreed maybe they should write down what they need to do when they are down town.*

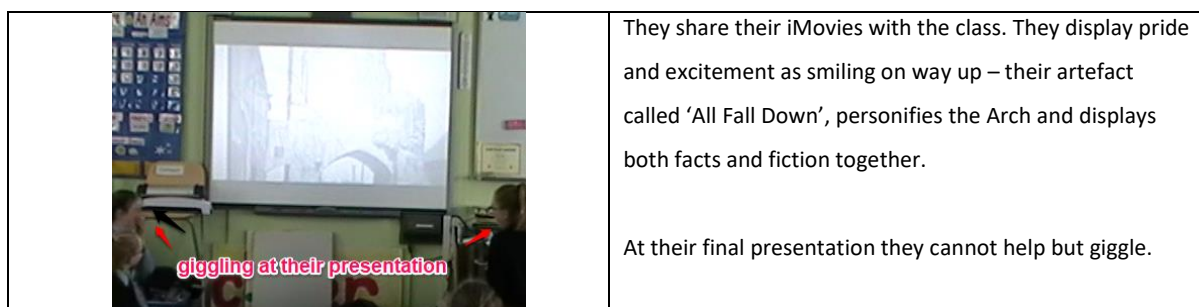
## Chapter Six Design Cycle Two

	<p>Girl A: We need to take a picture of the cemetery, find out the name of the cemetery, take a picture of the castle and take a picture of a cell by the cemetery</p> <p>Girl B:(inaudible ) and something at the castle</p> <p>Girl A: We'll find it when we're down there</p>
--	--

Figure 6-48 DC2 S2.5 Vignette 27 - Learningful Play

The following vignette (28) shows evidence of learningful play, girls are focused from the beginning, engaged and making their movie with obvious delight. They show evidence of creative learning as they layer historical facts and the town heritage sites with their own ideas:

<p>Learningful play</p> 	<p>From the storyboard session in the morning girls display evidence of interest and focus.</p>
<p>These girls are after adding music to their iMovie, and invite another girl over to watch it again with them. They are pleased with their work. One girl brings iPad somewhere to show someone, on her way back they high five each other with excitement. They show evidence of engagement with all the team leaning in, not looking up and focused on completion of their artefact. As another team present one girl in this team is humming their iMovie music and tapping her fingers. As soon as other presentation over they waste no time in getting back to their work.</p>	
	<p>These girls become excited they add music to their iMovie and now listening to it.</p> <p>Another girl comes over and they play for her and all laugh...</p> <p>One girl goes up with iPad to take some factual information and image of the north gate Arch off the whiteboard.</p> <p>They high five each other with excitement</p> <p>They then go outside to narrate together the title onto their iMovie.</p>



They share their iMovies with the class. They display pride and excitement as smiling on way up – their artefact called ‘All Fall Down’, personifies the Arch and displays both facts and fiction together.

At their final presentation they cannot help but giggle.

Figure 6-49 DC2 S2.5 Vignette 28 - Learningful Play

6.4.2.7. Fun toolkit

‘Using iPads’ was the highest ranked enjoyable activity, followed by learning outside of school and taking photos in the Fun Sorter (Table 6.12). These triangulated with the findings of the Again-Again table (Table 6.13). Every child in the class said they would like to use apps for history class again. 15 children (50%) said they would like to ‘Write a script’ again. However nine (30%) children’s least favourite was ‘Thinking of and writing the story.’

Table 6-12 DC2 S2.5 Ranking of Fun Sorter Activities (1-9)

Ranking of Activities	rank	Number One Activity	Number One and Two Activities (Combined)
S2.4 (n=30)	1	Using iPads (n=15)	Using iPads (n=23)
	2	Learning outside school (n=7)	Taking Photos (n=13)
	3	Taking Photos (n=5)	Learning outside school (n=10)
	2	Learning about my place (n=4)	Learning about my place (n=6)
	9	Thinking of and writing the story (n=9) Working with teams (n=6)	[Number 9 and 8 ranking combined] Thinking of and writing the story (n=15) Working with teams (n=9)
*Green – 1 <sup>st</sup> ranked choice, Blue 2 <sup>nd</sup> ranked choice, Orange 3 <sup>rd</sup> ranked choice			

Table 6-13 DC2 S2.5 Again-Again Table

Ranking of Activities – Again-Again Table*	N=			
	YES	NO	MAYBE	Blank
School 4 (n=30)				
Use Apps for History Class	30	0	0	
Use technology (example iPads, tablets) for learning	29	0	1	
Learning in a different place form school (example heritage center, castle)	27	0	3	
Taking photos	26	1	3	
Making a digital story	24	0	6	
Visit my town and learn about my place	23	1	5	1
Search for information on your story	20	1	9	
Work together on teams	18	5	7	
Write a script	15	6	9	
*Green – 1 <sup>st</sup> ranked choice, Blue 2 <sup>nd</sup> ranked choice, Orange 3 <sup>rd</sup> ranked choice				

### 6.4.3 Summary of findings

The findings indicate children enjoyed the overall project, learning history/heritage in-situ, then using technology to create their interpretations and digital artefacts. Interest in heritage increased through using technology. Technology served as a hook for some children and once the project began they liked interacting with heritage. Children's drawings have more heritage related drawings but display evidence of a balanced mix of heritage, technology, and heritage AND technology together. Their favourite part of the project was related to technology, which is making movies, comics, taking photos and using iPads. *'Using iPads'* was the highest ranked enjoyable activity, followed by learning outside of school and taking photos. Making movies was preferable to making comics. The hardest part of the overall project was the process of making, it was challenging figuring out how to use the apps and adding recordings such as voice overlays and singing was difficult. Taking photos increased the connection with monuments for one child and helped her remember. Children engaged with the process of making, not just the technology making, but in preparatory drawings, choosing pictures they took, and creating characters for their stories. There was evidence of creative thinking as they layered historical facts, town heritage sites, with their own creative ideas. Children had choice in making factual or fictional stories. Children found the story writing and getting ideas challenging but they helped each other out. They negotiated with each other and worked problems out themselves. The Fun sorter had shown that six children had listed *'working with teams'* as their least favourite, and only 18 would do so again (60%). Children noted disagreements and arguments over story ideas and making decisions. They found the process of post-it notes as a storyboard template easy to move ideas around when discussing ideas with each other. 15 children (50%) said they would like to *'Write a script'* again. However nine (30%) children's least favourite activity was *'Thinking of and writing the story.'* Children persisted in the face of challenge and displayed pride, and happiness when they overcame challenges. At times the process became boring but once they mastered content, they became intrinsically motivated and felt proud of their completed artefact. They liked sharing with others although this brought nervousness. After presenting and when peers liked their work they felt empowered. Heritage engagement on the field trip is evidenced through personal connections to the heritage and dwell time at the sites. Children had an existing high interest in history and heritage and there was an increase of 43% in finding history less boring post intervention. There was an increase of interest in, and enjoyment of learning history post-intervention. It was easier and more interesting learning in different ways than from a school book. Children learned more about their town and local history and heritage than technology and every child in the class said they would like to use apps for history class again. Learningful heritage play was present in this data.

### 6.4.4 Design changes resulting from S2.5

At this point after interventions in three schools, an optimal design for integrating technology into heritage learning, playful learning, and story writing was carried forward to the museum. As the setting in the museum is quite different to the school environment, it was not forecast that there would be any design changes. The evolving design sensitivities would be tweaked accordingly within the different learning context of the museum.

Chapter Six Design Cycle Two

6.5 Museum 2.6


DC2: M2.6	Overview and Methodologies																																																													
<b>Day One: 12<sup>th</sup> July 2017</b> Present: Sally																																																														
(a) Museum Guided Tour 	<table border="1"> <tr> <td>I have a cat</td> <td>I live outside Galway City</td> <td>I am left handed</td> <td>I Like to read</td> <td>I have been to another country</td> </tr> <tr> <td>I like funny movies</td> <td>I have a dog</td> <td>I have the same favourite colour as you</td> <td>I am an only child</td> <td>I walk to school</td> </tr> <tr> <td>I have been camping</td> <td>I like football</td> <td>Free Space</td> <td>I like to draw</td> <td>I am a middle child</td> </tr> <tr> <td>My name begins with 'c'</td> <td>I play sports</td> <td>I am a good runner</td> <td>I like vegetables</td> <td>I like swimming</td> </tr> <tr> <td>I have a sister</td> <td>I have a sweet tooth</td> <td>I have a clean bedroom</td> <td>I can speak Irish</td> <td>I have climbed a tree</td> </tr> </table> <table border="1"> <thead> <tr> <th>10</th> <th>Uses for <u>MyObject</u></th> <th>Words to Describe <u>MyObject</u></th> </tr> </thead> <tbody> <tr> <td colspan="3">Object Name: Example of an <u>Axe</u></td> </tr> <tr> <td>1</td> <td>Chop trees for wood, chop wood to make huts to live in</td> <td>Sharp, dangerous, important, valuable</td> </tr> <tr> <td>2</td> <td></td> <td></td> </tr> <tr> <td>3</td> <td></td> <td></td> </tr> <tr> <td>4</td> <td></td> <td></td> </tr> <tr> <td>5</td> <td></td> <td></td> </tr> <tr> <td>6</td> <td></td> <td></td> </tr> <tr> <td>7</td> <td></td> <td></td> </tr> <tr> <td>8</td> <td></td> <td></td> </tr> <tr> <td>9</td> <td></td> <td></td> </tr> <tr> <td>10</td> <td></td> <td></td> </tr> </tbody> </table>	I have a cat	I live outside Galway City	I am left handed	I Like to read	I have been to another country	I like funny movies	I have a dog	I have the same favourite colour as you	I am an only child	I walk to school	I have been camping	I like football	Free Space	I like to draw	I am a middle child	My name begins with 'c'	I play sports	I am a good runner	I like vegetables	I like swimming	I have a sister	I have a sweet tooth	I have a clean bedroom	I can speak Irish	I have climbed a tree	10	Uses for <u>MyObject</u>	Words to Describe <u>MyObject</u>	Object Name: Example of an <u>Axe</u>			1	Chop trees for wood, chop wood to make huts to live in	Sharp, dangerous, important, valuable	2			3			4			5			6			7			8			9			10		
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	a) Activity Sheets , Icebreakers, Object-based games, Scavenger hunts																																																													
(b) Museum Education Room	(b) Video and audio recordings																																																													
<b>Day Two: 13<sup>th</sup> July 2017</b> Present: Sally																																																														
(a) developing and sharing story ideas	Video and audio recordings																																																													
(b) constructing and presenting digital artefacts																																																														
<b>Day Three: 14<sup>th</sup> July 2017</b> Present: Sally																																																														
Video and audio recordings Post-questionnaire Fun Toolkit Reflection journals (for completion at home) constructing and presenting digital artefacts																																																														

Figure 6-50 DC2 M2.6 Overview and Methodologies





Figure 6-51 DC2 M2.6 Museum education room data capture set-up

## 6.5.1 Three-Day Overview

### 6.5.1.1 Day one

Day one began with introductions and some icebreaker activities for the 12 children (ten girls and two boys) to get to know one another. There were four desks in the education room; friends sat together and all joined up with children their own age. A short tour of the objects was given to the children by the education officer at the museum. This was followed by some object interpretation exercises:



touching and describing objects, and discussing their meanings. The aim for the day was for children to get a critical perspective of objects and be able to develop their own interpretations. Children chose their own teams and did a scavenger hunt around the museum looking for objects with different



*Figure 6-52 DC2 M2.6 Hannah raises her arms and says 'freedom' when allowed roam free in the galleries*

themes. One object on sheet mentions cultural diversity and they have to look for an object that celebrates a different culture than ours. One of the girls explains cultural diversity to the others. Children returned to the galleries to select objects for their stories, they were given iPads to capture and connect to objects that may have meaning for them, and think about their object interactions

overnight. They brought the small handheld recorders with them to record and interview each other about the objects. The day one exercises aimed to feed into their story making process on day two.

#### *6.5.1.2 Day two and three*

Day two began with more object-based activities. This was followed by sharing of ideas of possible objects for inclusion in their stories. The next stage was story-writing, planning and using the post-it notes to develop a story on the objects they had liked. Similar to the schools everyone began by making a comic. With numbers low (N=12) and with help from two research assistants there was plenty of support available to the children, to figure out the technologies and with their stories. Children were free to go to the galleries as they needed. All teams shared their comics during day two. This was followed by trying out iMovie. On the projector we went through the features of iMovie. As with the school programmes ideas and processes were shared throughout with everyone. Art supplies were available to children for drawing. Four of the six teams, used art and crafts and photographed their art for their comics and movies. One team used images of the objects for their comic and movie, and another used Minecraft screenshots for their comic. Parents, guardians and friends were invited to attend a public screening of the children's work at the end of day three.

### 6.5.2 Findings

#### *6.5.2.1. Materiality*

In this transcription excerpt from the handheld recorders two girls discuss their favourite objects as they walk around the museum. Having time to meander through the galleries and having freedom to move around the museum was important for children to get familiar with the objects:

## Chapter Six Design Cycle Two

[00:00:00] Aisling : What were your favourite collection of clothing that you saw in this museum

[00:00:05] Nora: Wait....I don't get you

[00:00:09] Aisling : like basically was it like this hat. was it-

[00:00:14] Nora: -Oh you mean my favourite object

[00:00:19] Aisling : No..Your favourite object clothing

[00:00:20] Nora: O:::h

((both start walking through the museum))

[00:00:27] Aisling : That was a piper hat

[00:00:29] Nora: I don't see any cloth

[00:00:30] Nora: Ok what's your favourite

[00:00:31] Aisling : Mine..Let me show you

[00:00:33] ((walking around))

[00:00:42]Aisling : this way

[00:00:43] ((door squeaks))

[00:00:49] Probably that one ((points to high black helmet with gold attachments))

[00:00:49] Nora: that's (weird?)

[00:00:53] ((walks away from object))

[00:00:59] Aisling : Ok let's go....Want to go back in classroom now

[00:01:00] Nora: Ok.

When asked *What did you learn?* there were 12 responses and 20 UOMs (Table 6.14). Children learnt about technology (comics and movies) (N=10), history (N=8) and working in a team (N=2):

*Table 6-14 DC2 M2.6 Questionnaire – What did you learn?*

Technology	Learning history	Teams
10	8	2

"I learned lots of interesting history about medevil Galway and the 1st world war"

In the VAS statements in the Questionnaire three children (25%) found history boring pre-intervention. One child who said YES to '*History is boring*' commented '*due to the way school teaches it*'. Post-intervention no children said history was boring. *I enjoy learning history* remained the same (67%) showing a change of one response from NO to MAYBE. Agreement with the statement *Heritage is interesting* decreased post intervention by three children to from N=10 to N=7, NO increased from one to three children and MAYBE from one to two children. There was a decrease in agreement with *I like exploring history and heritage in different ways* by one child from eleven to ten with one child saying NO and one saying MAYBE. In short history became less boring after the intervention for all children and children enjoy learning history. However, children's interest in heritage declined after the workshop as well as a slight decrease in enjoyment of exploring history and heritage in different ways.

	Pre	Yes	No	maybe	Post	Yes	No	maybe
9. Heritage is interesting		10	1	1		7	3	2

Figure 6-53 DC2 M2.6 Heritage is Interesting - VAS questionnaire

The literature has pointed to museums as being boring stuffy places, and evidence of this assumption can be found in the children’s data:

[00:00:14] Nora: What do you think about the museum Lena?  
 [00:00:17] Lena: I think it's very old  
 [00:00:19] Nora: Is it interesting?  
 [00:00:20] Lena: No

Figure 6-54 DC2 M2.6 Children recording each other



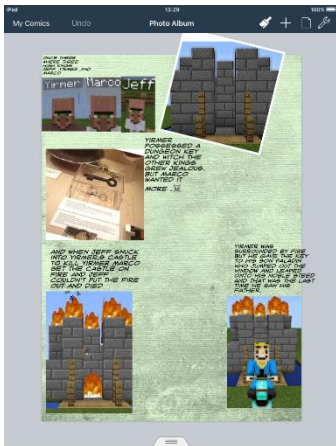

The tour, similar to the museum intervention in DC1 was found to be boring:

[00:00:42] Nora: What would your least favourite thing be...oh sorry i just asked that ..what was your least favourite thing on day one and day two  
 [00:00:55] Aisling : Day one it was probably getting the tour as ( ) was really boring and Day two it was probably because when we had to... probably do a bunch of work  
 [00:01:14] Nora: yeah a bunch of work

However, some children enjoyed the tour:

*‘I enjoyed the tour and I think it was really fun’ and ‘I learned a lot at the tour around the exhibits and artefacts which inspired me for many different story ideas’*

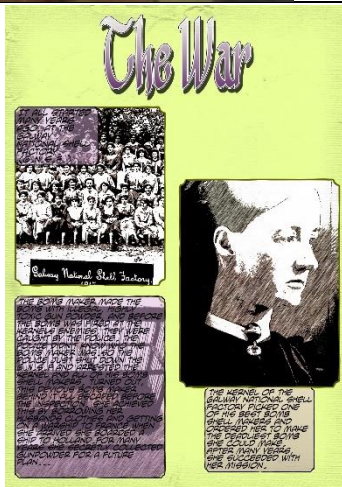
In this vignette (29) children’s final digital artefacts show evidence of using objects as entry points to imaginative stories:

Museum Digital Artefacts	Team objects chosen as starting points for stories
	<p><i>The Great War</i></p> <p>Objects: Galway Shell Factory enlarged photograph of women employees during WW1, WW1 shell, and letters written during the war</p>
	<p><i>The King's head</i></p> <p>Objects - Typewriter Post Box Bust of Eamon Ceannt</p>
	<p>Comic in progress from one team - two objects of a prehistoric sword and a gaol key are brought into a Minecraft story</p> 



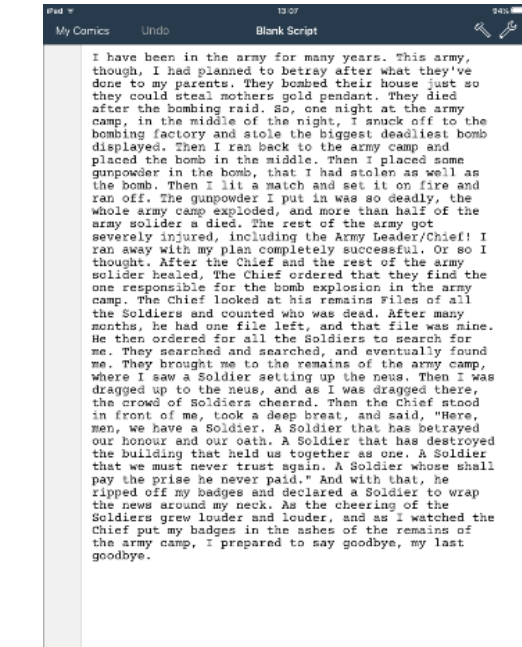
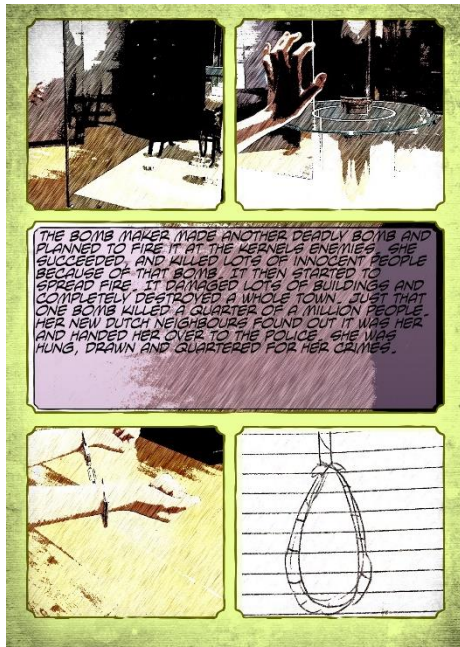
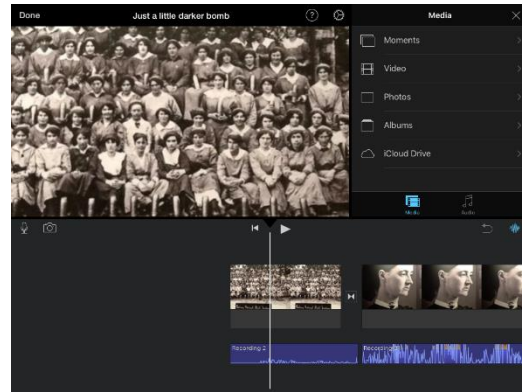
Left: Using photographs of four objects to make replicas in clay as props for their movie

Below: Objects talk via speech bubbles



The War

Objects: Galway Shell Factory, WW1 shell.





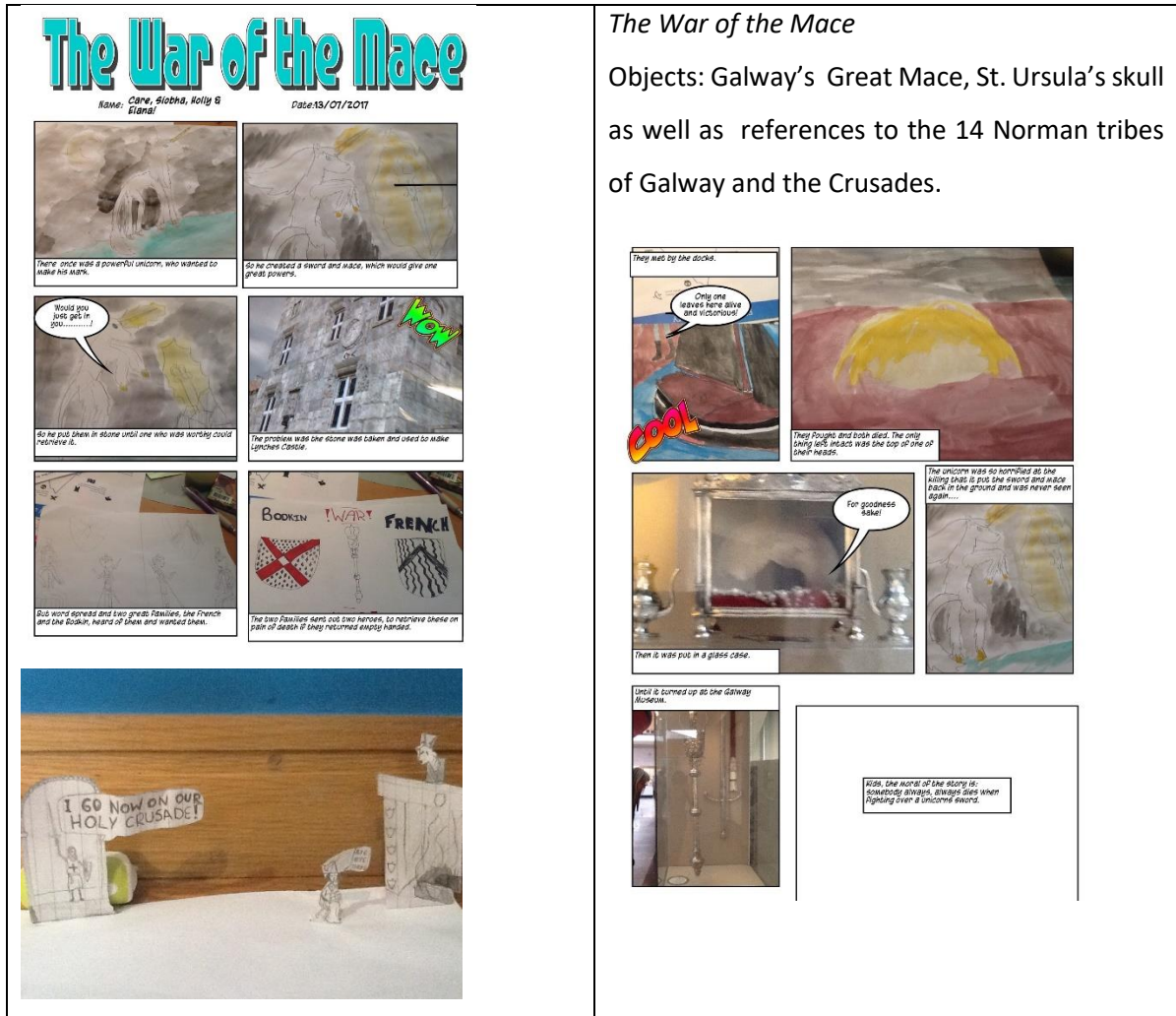
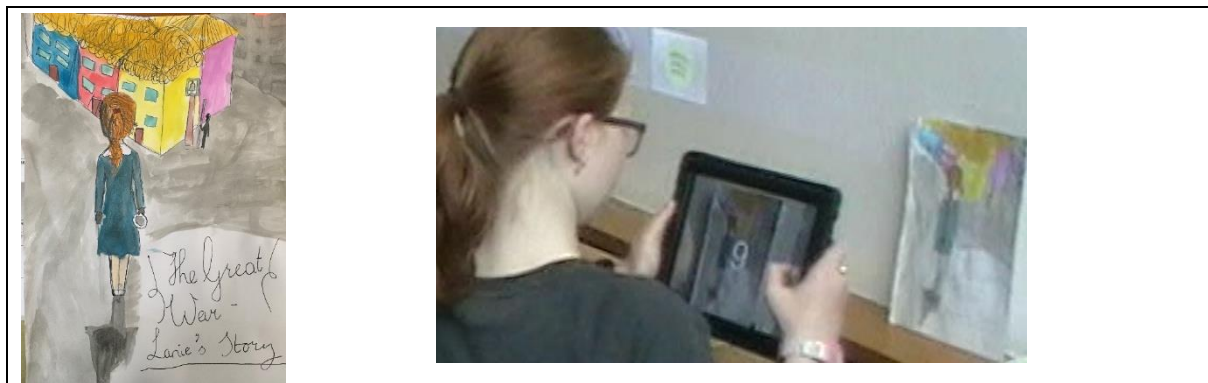


Figure 6-55 DC2 M2.6 Vignette 29 - Children's final artefacts

6.5.2.2. Engagement

This team of two draw and paint their cover of their story. They name their character at the beginning. The girls find different corners of the museum and room to record their audio. In an interview of each other held in the galleries it was found the workshop was not boring and was fun.



Chapter Six Design Cycle Two


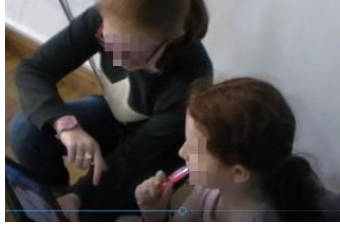


		
		Girls present their first comic
<p>[00:00:00] April: what did you think about yesterday                  [00:00:03] Lena: I thought.. it was very in-ter-esting                  [00:00:07] April: Was anything in any way boring                  [00:00:09] Lena: no                  [00:00:12] April: was anything terrible                  [00:00:13] Lena: no                  [00:00:14] April: was there anything you didn't like                  [00:00:15] Lena: no                  [00:00:17] April: was everything very fun                  [00:00:17] Lena: yeah                  [00:00:19] April: ok                  [00:00:19]                  END</p> <p>START</p> <p>[00:00:00] Lena: Hell:::o ((whispers))                  [00:00:03] April: yesterday was very fun nothing was boring and we got a lot done                  [00:00:09]                  END</p>		

Figure 6-56 DC2 M2.6 Vignette 30 Engagement

Positive Affect is integral to engagement. In this vignette (31), recorded by two children, there is evidence for enjoyment being important in the children's learning experience.

<p>[00:00:01] Nora: Ok this is my favourite object ((Nora is standing in front of post box))                  [00:00:04] at least one of them I have two                  [00:00:05] Aisling : the po::st box is your favourite is your favourite object                  [00:00:09] Nora: ((walks away)) [00:00:10] and this my second one                  [00:00:12] Aisling : your second favourite                  [00:00:15] Aisling : my second favourite is the head ((focuses camera on Eamon Ceannt's head))                  [00:00:17] Nora: yeah same                  [00:00:18] Nora: actually but no actually my second favourite object is not the head its; the ( ) ((camera goes to a rifle type gun))                  [00:00:25] [00:00:26] ((Nora does a shooting gesture))</p>	<p>Nora and Aisling discuss objects as they walk around the museum</p>
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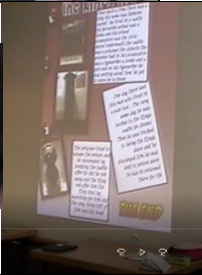
<p>[00:00:27] Aisling : but then my third favourite is probably the typewriter cos it's pretty cool          [00:00:33] Nora: yeah ((not enthusiastically)) ((looks at typewriter and walks away)) ((sticks tongue out))          [00:00:37] END</p>	
	<p>Aisling and Nora read out the list of objects they want for their story, once they had their objects and shared their ideas with the group, they had a clear goal of making their story. Later they go to Minecraft specifically to make an animal (Llama) for their story. They show evidence for imagination and creative engagement when they combine ideas and unusual objects to write a story.</p>
	
 	<p>Their objects include their favourite objects as listed above, such as the civic sword, typewriter, a bomb, a gun, post box, bust of Eamon Ceannt. They present their story to the other children and get feedback which they incorporate into their final comic.</p>
 	<p>When they presented publicly their artefacts they showed evident signs of delight.</p>
<p>[00:00:00] Nora: I thought it was gre::at          [00:00:02] Aisling : What did you like          [00:00:05] Nora: I liked that we got to pick our teams and work together to make a movie and a cartoon          [00:00:12] Aisling : a comic          [00:00:14] Nora: a comic cartoo:n          [00:00:14] Aisling : Did you enjoy making the movies and the comic          [00:00:16] Nora: sorry          [00:00:17] Aisling : did you enjoy making the movie and the comic          [00:00:18] Nora: yes I <u>really</u> did enjoy it</p>	<p>On the last morning Aisling asks Nora her opinion on the workshop.</p>

Figure 6-57 DC2 M2.6 Vignette 31- Engagement



## Chapter Six Design Cycle Two

### 6.5.2.3. Digital augmentation

In this transcription excerpt two children are in the galleries recording each other. This audio piece shows evidence of challenges when using technology and also for the enjoyment that challenge brings.

<p>[00:00:00] Nora: ↑Hi          [00:00:01] Aisling : Hello:::↑          [00:00:03] What was your favourite thang in this summer summer time ((drawls))          [00:00:07] Aisling : Probably making the movie          [00:00:12] Nora: And am ((zooms out)) what was the easiest bit ((swinging the camera around))          [00:00:15] Aisling : I'd say the comic because it didn't take that long          [00:00:18] Nora: And what did you not really like          [00:00:20] Aisling : I didn't like how difficult it was making movies but it was still fun at the same time          [00:00:28] Nora: ↑That's what I say ((animated american accent drawl))          ((both laugh))</p>
---

Whereas the technology at times was difficulty and frustrating it was also fun:

<p>[00:01:00] Aisling : you can sit do::wn, it can be like a proper interview          [00:01:08] Aisling : so did you find anything fun like what was the most fun thing you've done in this camp          [00:01:15] Nora: am..I pretty much liked it all ((gestures with both hands up)) even the movie I thought that was fun cos like it was horrible it was fun everything I guess I'm being honest</p>
---

Two boys evidence how iPads were important in their enjoyment of the workshop:

<p>[00:00:04] J: how was the camp what did you like about it          ((both laughing))          [00:00:18] J: What did you like          [00:00:21] C: am dont know          [00:00:25] C: it was a good camp-          [00:00:26] J: so far=          [00:00:27] C:=so far          [00:00:32] J: but what did you like about it          [00:00:36] C: the iPads [00:00:39] the iPads [00:00:42] and the iPads          [00:00:44] J: Ok let's go back to the head quarters          [00:00:48] END</p>
--

When asked *What did you learn?* (Table 6.15) there were 12 responses and 20 UOMs. Children learnt about technology (comics and movies) (N=10), history (N=8) and working in a team (N=2).

Table 6-15 DC2 M2.6 Questionnaire – What did you learn?

Technology	Learning history	Teams
10	8	2
"I learnt the proper functions of imovie; I learnt the feeling of being recorded; I learnt how to use a comic app properly and also how to MAKE a comic"		(child M2.6)

The two statements regarding technology and heritage (a) *Heritage is more interesting when using computers* and (b) *Technology makes learning history and heritage more interesting* produced a small increase in agreement with both statements (N=2). Seven (58%) and eight (67%) children agree post intervention to statements (a) and (b) respectively. There was a decrease in the amount of children disagreeing with statement (a) (from five to three children) for statement (a) and a decrease in those unsure about statement (b) from four children to two children. It can be inferred that heritage and history is more interesting when using computers. However, post intervention technology and or computers do not enhance interest in heritage and history for the children. This may be related to the high level of interest they showed in technology and making in this project rather than with heritage engagement.

#### 6.5.2.4. Visual data findings

Nine children returned their reflection journals, six of which included a total of thirteen drawings



(Appendix Z). Three drawings reference elements within the museum (23%) one signposting the museum, one referring to a team of four with a book called ‘Medieval Times’ and one to an object used in a story. This drawing (with the object) was the only one that showed an interaction of heritage with technology (8%). Six images (46%) refer to the technology only aspect of the workshop. Four other drawings (31%) represented sociality and the story making process.

Figure 6-58 DC2 M2.6 Drawings referencing Technology engagement

The hardest part of the two days was the making the movie (n=7) followed by story writing (N=3), choosing objects (N=1) and sharing work to peers (N=1) (Table 6.16).

Table 6-16 DC2 M2.6 Sample quotes – Hardest Activity- Children's reflection journals

“recording the imovie but I still liked it”
“coming up with a topic that everybody you were working with liked. Everybody has such different ideas and if somebody didn’t like it, then they wouldn’t be participating as much.”

#### 6.5.2.5. Sociality

Working with friends is important in fostering a playful learning environment:

Hannah: I like that we got to work in groups our own a::ge so we could actually find who we could relate to
---

Story-writing was the hardest part for three children (25%), and was related to finding ideas that worked for everyone:

“coming up with a topic that everybody you were working with liked. Everybody has such different ideas and if somebody didn’t like it, then they wouldn’t be participating as much.”

#### 6.5.2.6. Playful learning

Making connections to children’s everyday interests (e.g. Minecraft) is important for engagement. Humour is important in a playful learning environment. In this audio excerpt two boys discuss objects they like alongside humorous banter:

Jack: so what did you like about this camp  
((both are giggling))  
Culann: the sword the bomb and the iPad  
[00:00:10] Jack: ok now what else what felt educational  
[00:00:20] Culann: @Minecraft  
[00:00:22] Jack: ((laughs))  
[00:00:22] Ok good point ...now did you see any.. you know anything you like  
[00:00:33] Culann: well I like the skull and the mace the great mace  
[00:00:39] Jack: ((laughs))  
[00:00:42] Jack: ok  
((switches to Culann video, we see Jack))  
[00:00:44] both laughing))  
[00:00:47] Culann: What did you like  
((laughing as camera jumping everywhere))  
[00:00:52] Well I liked the... the swords the great mace and Minecraft  
[00:01:02] ((both laughing))  
[00:01:09] and sexy llamas in Minecraft  
((both laughing))  
[00:01:13] END

Choice for children is vital in a playful learning environment. In this audio piece two children record themselves as they walk around the galleries:

Hannah: I liked it that we were allowed to just.. go all out and do what we ↑wan:ted for the stories they didn't have to be a certain wa::y... apart from just containing the objects which was fun I also liked that we could choose our own ↑objects

[00:00:01] we probably got to learn whenever we wanted and we could like take breaks...and we could decide... what we wanted to do and when we wanted to do it  
[00:00:11] END

In the following audio excerpt these girls show pride in their completed artefacts as well as joy in the freedom of choice for filming:

((soft spoken throughout))  
[00:00:04] Hello  
[00:00:13] S: Yesterday was a ↑really fun day  
[00:00:20] S: the comics well really good I think we did ok in them ..it was really good how. (0.1) you just let us do our own thing and make up our own thing

## Chapter Six Design Cycle Two

[00:00:32] S: also with the filming.. really really really liked the freedom we were given in it and also the fact that you didn't mind us being a little bit late... and yes Elena I know I'm supposed to speak louder but  
[00:00:48] e: this is who I am

The following audio excerpts show how the freedom to choose their learning path resulted in a relaxed playful environment conducive to learning:

[00:00:01] We enjoyed that am there was no really rules=  
[00:00:06] =and it wasn't too intense like we got to like play as well  
[00:00:10] yeah and that sort of encouraged us to learn more  
[00:00:14] yeah  
[00:00:16] it was enj...it was really fun

[00:00:00] We enjoyed that we got to have freedom  
[00:00:04] and we got to ( ) were treated like adults  
[00:00:11] and we got coffee  
((background noise))  
[00:00:14] END

A playful learning environment fosters creativity and this was evident in the following audio excerpt. This child is keen to improve on her artefact and learn from her perceived mistakes after creating and sharing her work with others the previous day:

[00:00:03] Elena: Hi so this is my thoughts on yesterday Thursday the 13th of July of the digital course. second day of the digital course. I ↑thought it was brilliant better than Monday if that is even possible I just ↑loved doing the comics and I just ↑loved even more doing the movie and I'm so excited today to contin:ue and fix the mistakes that we made yesterday. ↑Thank you

This poem show evidence for playful learning; because children had choice, freedom and the atmosphere was playful it helped the children learn more.

### A Bunch of Work

*(verbatim audio reflections from participants)*

*nothing was boring  
we got a lot done*

*we got to have freedom  
we could decide  
what we wanted to do  
and when  
we wanted to do it*

*we also learned an awful lot  
from the artefacts,  
choose our own objects  
inspired us a lot  
for making stories and comics,  
they didn't have to be  
a certain way  
lots of stuff everywhere,*

*I was pretty messy*

*The rose pattern  
of the civic sword  
and the great mace,  
an interesting view of history,  
History and Art*

*I didn't like how difficult it was making movies  
but it was still fun at the same time,  
it wasn't too intense  
like we got to like play as well,  
and that sort of encouraged us to learn more*

*we had to... probably do a bunch of work*

*yeah a bunch of work*

### Positive Affect

When asked *Did you enjoy the project? Why? Why not?* enjoyment, loving it and fun formed the highest responses (N=7) out of 19 UOMs (Table 6.17). Having freedom to explore was important (N=4), having choice in learning (N=1), opportunities for creativity (N=1), being with friends (N=2), learning new things (N=1), liking history (N=1) and using technology (N=2) were the reasons the children enjoyed the museum experience.

Table 6-17 DC2 M2.6 Questionnaire – Did you enjoy the project?

Positive Affect	Freedom	Teams	Technology	Choice	Creativity	History	Learning
7	4	2	2	1	1	1	1


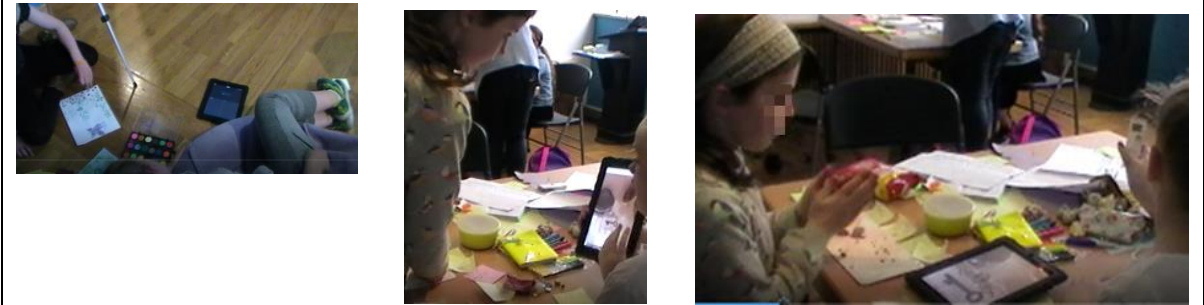
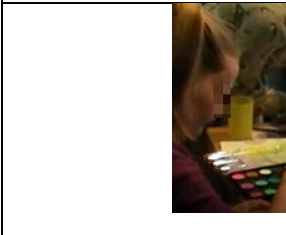
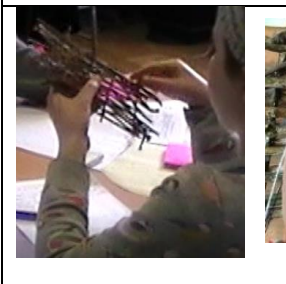
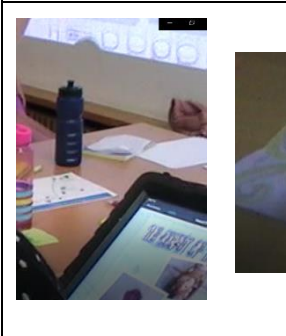
"I enjoyed the project because we got to learn OUR favourite way"
"I enjoyed it because it allowed me to be creative"
"I enjoyed it and loved it! We got all the freedom we could want, and we got to make cool projects!"

### 6.5.2.7. Parents survey

Parents found the workshop to be a positive 'comfortable' learning experience for their children. The survey responses commented on the child-centered, self-directed, discovery learning process and how this was different to anything the children had done before. Parents stated their children enjoyed the workshop, it was 'eagerly anticipated each day' and they referred to the artefacts, history and technology together. Asked on suggestions one parent commented on perhaps stricter punctuation, grammar and historical facts. On a Likert scale question where parents chose a 5-star rating for certain questions, one parent gave one star to 'Researching chosen objects' because 'the stories behind them were not presented, rather an invention of story'.

6.5.2.8. Learningful play

The following vignette (32) shows evidence for learningful play. There is engagement, good team work, integrating of museum objects, creativity, imagination, technology use and many characteristics of a playful learning such as intrinsic motivation, self-chosen and self-directed learning, joyfulness, humour and fun.

	<p>This team of two girls are enthusiastic from the beginning. They focus on story writing using the post-It notes.</p>
<p>They paint, sculpt and embroider their own props and copying object images on their iPad</p> 	
	<p>Girls have conversations about everything, even about the names they will use:</p> <p>S: Marcus or Magnus?          K: well, I think Marcus is too like Leo          S: Nods in agreement</p>
	<p>Girls made a raft at home along with an embroidered sail and brought in on day two for their story.</p> <p>They had a clear goal of what their story was and show evidence of imagination and persistence in making their props.</p>
	<p>Girls show evidence of creative thinking when they choose 2 objects each and incorporate the 4 objects into their existing ideas. Their movie is a continuation of their story process in their comic. They make their movie on the iPad using their own props and themselves as actors. They film throughout the museum and use the objects as backdrops. They use speech bubbles on paper and photograph beside the objects as their narrative. One such object is a trophy made by the girls and included as movie props.</p>

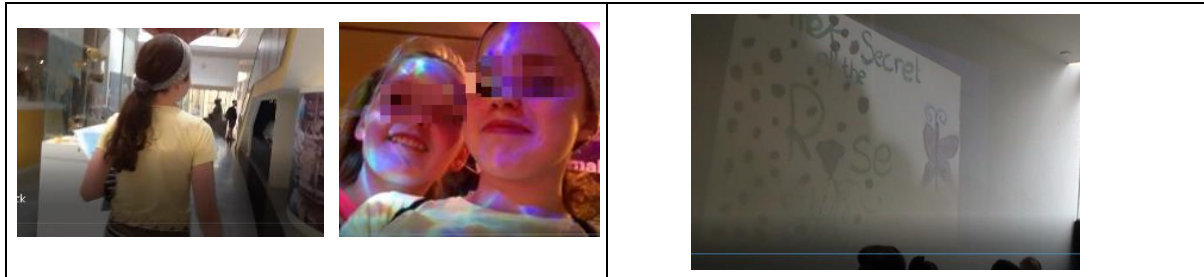


Figure 6-59 DC2 M2.6 Vignette 32 -Learningful Play

Nine of the twelve children returned their reflection journals. When asked ‘*What was your favourite part of the 2 days?*’, the 25 UOMs referenced the making process (N=7), technology (N=6) (movies (N=2), comics (N=4)), freedom and choice (n=3), positive affect, fun and enjoyment (N=4), being with friends (N=3), creativity (N=1) and learning (N=1). In summary, their favourite activities were having the freedom to choose what they made in their comics or movies, and having the freedom to move around the museum with friends (Table 6.18). The playful environment fostered their learning and creativity.

Table 6-18 DC2 M2.6 Sample quotes – Favourite Activity- Children's reflection journals

<p>“making the props for the movie. It was so fun being creative and I loved how we could do the storys our own way”</p> <p>“my favourite part of the 3 days was it all but if I had to choose I would go for the last day when we made the second movie. I laughed a lot and it was so much fun”</p>
---

There was evidence of learningful play in the children’s written daily reflections. They reflected (a) playful learning, (b) engagement, (c) digital augmentation and (d) sociality. They had fun learning about objects and technology with existing and new friends. Additionally, children enjoyed the freedom to choose their own direction in learning.

(a) “I love how we had some freedom in our groups”

“I learned a lot at the tour around the exhibits and artefacts which inspired me for many different story ideas”

(b) “One of my favourite artefacts was the bomb and the story behind it” (Child – Museum 2.6) (subsequently this child’s digital comic and movie included this object)

“I didn't like the leanth of the day- it should have been longer.”

“I really enjoyed it and I love how we had some freedom in our groups. ~~I am super exist for~~ I cant wait for today when you said there were know rules it made me want to learn more I wish it was longer than 3 days. I really like it and cant wait to see what will happen today.”

(c) “I loved that we got to use tablets and find things all around the museme”

(d) “I enjoyed making new friends and learning new things”



6.5.2.9. Fun toolkit

Making a digital story was the top ranked activity in the museum (Table 6.19). This triangulates with the Again-Again table where *using iPads* and *Make a video to tell a story* were the top two activities children said they would do again (Table 6.20). *Thinking of and writing the story* was the ranked first favourite activity by 4 children (33%) and in the top two favourite activities by 8 children (67%). This was much improved from the school numbers where, it was ranked in the top two favourite activities school by 4 children S2.3 (17%), 1 child S2.4 and 1 child in S2.5.

In DC1, children in the museum talked about fun with their museum experience, whereas their parents referenced learning (Fig. 5.29). In DC2 *Learning outside of school (like a museum)* is ranked the lowest in favourite activities, yet the written data points to a positive learning environment. Equally *Using apps for history and heritage learning* has the least number of children that would like to do the activity again in the Again-Again table. Children did enjoy using the apps but not for the purpose of heritage learning. In this intervention children’s interest is in technology and making movies with their friends as evidenced in the Fun Toolkit table below.

Table 6-19 DC2 M2.6 Fun Sorter - Ranking of Fun Activities

Ranking of Activities	Rank	Number One Activity	Would you do this activity again?	Rank number	Number One and Two Activities (Combined)	Would you do this activity again?
Museum (n=12)	1	Making a digital story (n=4)	10	1	Making a digital story (n=8) – 66%	10
	2	Using iPads (n=3)	11	2	Using iPads (n=4) -33%	11
	2	Looking for and finding information for my digital story (n=3)	6	2	Working with teams (n=4)	10
				2	Thinking of and writing the story (n=4)	8
	9	Learning outside of school (like a museum) (n=3)		9 and 8	-Learning outside of school (like a museum) (n=4) -Looking for and finding information for my digital story ) (n=4) -Using iPads) (n=4) -Learning about objects) (n=4)	
*Green – 1 <sup>st</sup> ranked choice, Blue 2 <sup>nd</sup> ranked choice						



Table 6-20 DC2 M2.6 Again-Again Table

Ranking of Activities	YES	NO	MAYBE	Blank
Using iPads	11	0	0	1
Make a video to tell a story	10	1	0	1
Use Technology (example iPads, tablets) for learning in a museum	10	0	1	1
Work together on teams	10	0	1	1
Taking photos	9	0	2	1
Use comics to write a story	9	0	2	1
Learn with objects in a museum	8	1	2	1
Write a script	8	2	1	1
Make a digital story	7	0	4	1
Search for information on your project	6	0	5	1
Using apps for history and heritage learning	5	2	4	1

### 6.5.3 Summary of findings

The findings indicate children liked the enjoyment and fun of the museum experience. Enjoyment is related to having freedom to explore, having choice in learning, opportunities for creativity, being with friends, learning new things, liking history, and using technology. Children learned about technology, history and working in a team, technology here is related to making movies and comics. Children found making the movie difficult (a 'horrible fun') as well as story writing, choosing objects and sharing work to peers. Children enjoy learning history which became less boring after the intervention for all children. However, children's interest in heritage declined after the workshop as well as a slight decrease in enjoyment of exploring history and heritage in different ways. Children's drawings show little engagement with history heritage or objects. Drawings of returned reflection journals (75% returned) display evidence of engagement with technology and with each other. However children's final digital artefacts show evidence to the contrary. Children learned about the objects and used objects in their comics and movies. To the children heritage and history is more interesting when using computers. After the intervention interest in heritage itself declined. This may be related to the high level of interest they showed in technology and the process of making in this project. Children's interest is in technology and making movies with their friends as evidenced in the *Again-Again* table. There, *Using apps for history and heritage learning* has the least number of children that would like to do the activity again although they enjoyed making with iMovie and Comic Life. Children did enjoy using the apps and making through the apps but not for the purpose of history/heritage learning. *Making a digital story* was the top ranked activity in the museum. Although the story process was found difficult by 3 children (25%), *Thinking of and writing the story* was the ranked first favourite activity by 4 children (33%) and in the top two favourite activities by 8 children (67%). *Learning outside of school (like a museum)* is ranked the lowest in favourite activities in the Fun Sorter, yet the written data points to a positive learning environment. Children worked hard on their artefacts and were keen wanted to improve on

previous iterations. Children evidenced engagement and pride when they presented their final artefacts to parents and friends. Parents liked the child-centered, self-directed, discovery learning process and were happy with their children’s enthusiasm. One parent would have liked stricter punctuation, grammar and historical facts in his child’s artefacts. This parent also commented on how factual stories behind the objects were not presented, but rather fictional interpretations. For example, one team animated all their favourite objects using speech bubbles in a fictional movie. As objects became starting points for stories, the playful environment of the project as well as the context fostered creative engagement and learning. Because the learning environment was different to school, with children having more choice and freedom and no rules, it encouraged them to ‘learn more’ and provided the conditions for intrinsic motivation and creative learning. Children’s favourite activities was related to having freedom to choose what they made in their comics or movies, and having freedom to move around the museum with friends. They had fun learning about objects and technology with existing and new friends. Learningful heritage play was present in the data.

## 6.6 Discussion across Schools and Museum

### 6.6.1 Development of Learningful Heritage Play



Figure 6-60 DC2 Learningful Heritage Play Indicators

Learningful play as defined earlier relates to children learning, with others and through technology in a playful, positive, engaging, environment. There were times when the learning environment was not a stress free playful learning environment. In S2.3 this happened when children were engaging with Minecraft and the tensions and excitement learning with Minecraft brings, e.g. grieving and arguments over sharing of iPads. Positive relationships with other children is vital for a playful learning environment. Because of team tensions ‘*working with teams*’ was the lowest ranked activity on the Fun Sorter of S2.3 although 13 children (57%) said they would like to do so again. However for those children who did not get on together as evidenced in earlier vignettes, the whole learning experience is affected. Positive social collaboration is important to foster in this design for heritage engagement, not just for its contribution to learning in general but for keeping in mind what Carman (2002) believes as the purpose of heritage: understanding ourselves and others and increasing our joy in a shared world.

In S2.4 evidence was found for all aspects of learningful play. Tensions between children did exist, but when things settled down (after the excitement of the novelty of the iPads and Minecraft), when a balance was found between free and guided play, this afforded the opportunities for a playful environment that led to optimal learningful play. A good example that shows learningful play in action is in vignette 22 (Fig. 6.38). Here, children's process embedded the characteristics of creative learning (Lucas 2016, Resnick 2007a). They adapted, iterated, and improvised, all necessary skills for children (Resnick and Rosenbaum 2013). This vignette (22) showed how challenging it was for the boys, however they were intrinsically motivated to do the activity because of its challenge (Ryan and Deci 2000). Here children were providing evidence for flow. Deep learning is happening when in flow and when they get 'carried away' with an activity (Csikszentmihalyi 1990, Csikszentmihalyi and Hermanson 1995). Another learningful play example can be found in Fig. 6.37. In this vignette (21), where the team built the town in Minecraft, they show evidence of learning, through defining their goals within game constraints (Short 2012).

In S2.5 all elements of learningful play were present: playful learning, freedom to be creative, technology that worked, engagement, getting on well with teams. Within structured activities children had choice of free digital play and free movement. However, there were complaints from other classrooms when children were recording their audio for their movies outside. Children can be restricted in a school space to roam freely. Learningful heritage play (Fig. 6.60) evolved from the first school S2.3 to the last school S2.5 where at that point there was an even spread in what the children enjoyed between the field trip, using iPads (making), friends and the overall project being fun. Learningful heritage play can be understood as learningful play together with engaging heritage interactivity. At the end of S2.5 an optimal design for learningful heritage play was reached which would be further refined in the upcoming museum intervention.

In the context of the museum there is evidence for learningful heritage play. Two particular good examples are Fig. 6.55 and 6.58. Both examples show how children interacted with, learnt about and used objects creatively in their artefacts. These examples show children getting on together, and enjoying the affordances technology brought to their stories. Evidence was also found in written data that reflected materiality, playful learning, engagement, digital augmentation and sociality.

### *6.6.1.1 Materiality*

#### *6.6.1.1.1 Developing connection to heritage and place*

Children showed evidence for ownership of, connection to, and growing awareness of their local heritage and places. In S2.4 children displayed detail and great pride in the Minecraft town they created. In S2.5 children made personal connections on the field trip, they included references in the

written data to 'our town' and showed the importance of a local ballad song by including it in their digital artefacts. Unlike S2. 4 and S2.5 where there was a rich abundance of built heritage surrounding children, in S2. 3 this was not the case. The only monument in the town is the motte, and it leaves to the imagination what could have been there. Imaginative work, especially in a place where School 2.3 was located, in a rural part of the Irish midlands is vital when very little ruins are visible. Yet the children here showed evidence of deep engagement with heritage, and were horrified the motte had been looted in the intervening period between the project and the focus group. Evidence can be noted in the poem from children's data '*I own it*' and "*its mine*" in this school. Through heritage and place-making children made connections and developed understandings (Walsh 1992). By 'doing' heritage through social interaction and conversation (Hall 1997) children made meaning contributing to their identity making. Children's engagement began with the tangible and 'found' heritage. Although Holtorf (2013) argues for taking materiality seriously and taking less of a constructivist approach to archaeological objects, children had the opportunity to engage with materiality seriously and make their own meanings in creative constructivist ways. This was a different format of engaging with history for the children as was evident in the data. In this thesis as engagement with heritage is the core aim, different contextual settings required different approaches. Teachers have certain curriculum requirements they must cover and as evident in S2.3 and S2.4 teachers like to see factual information brought into the children's work. However the playful ethos of the project gave children opportunities to build on 'facts' using their imaginations. Although imagination is argued for and against in the teaching of history (Cooper 2014, Egan 2007), here creative expression and imagination was encouraged.

In contrast to the school children the children in the museum did not engage with history or heritage to the same level. Learning is different in different physical contexts (Falk 2006) and whereas children interacted with objects and learnt about them, the data points to the creating and making aspect of the project being more engaging to the museum children. Engaging with history in more meaningful and authentic ways has been argued for learning history since the 1980s (Lee et al. 2006) and this is especially relevant to learning about objects in glass cases. In Warpas' study she found problems with museums existing models of engagement (usually cognitive) regarding objects in glass cases (2014). A different engagement model was required, one to foster discussion when children cannot touch objects. In her study of designing for affective engagement with objects her model did not require adherence to curated historical facts (Warpas 2014). Similarly in this thesis to foster engagement, children were encouraged to be creative with their interpretations. However, although children used objects creatively rather than factually, from their written data they did not appear to engage with the objects per se. As evidenced in this data, some children found the museum itself to

be 'not interesting', and *Learning about objects* was ranked low in their favourite activities. Perhaps this can be related to not having contact with the objects, no touching assumptions (Dudley 2010), the stuffiness associated with museums (Walsh 1992) or the fact the tour was boring as evidenced in the data. Yet if objects are 'ideas reified' (Hein 2014), and their function is to generate a satisfying museum inquiry learning experience (Hein 2014), then the video data, learning processes and the final digital artefacts show creative engagement with objects from ideas to final artefacts.

History as a school subject has been found to be boring (VanSledright 2008) and to alleviate this boredom more 'knowing' and understanding about the local is vital (Preston 1969). After the interventions history was not boring to the children, interest in history and heritage increased and the project was considered a '*funner way of learning*' (S2.4). Being out '*ON the Motte*' (S2.3) and learning outside of school was more interesting than learning from books. Cooper (2014) has pointed to the lack of engagement with learning history through textbooks rather than through historical inquiry active based learning. In School S2.4 which had existing high interest in history and heritage, they like the other schools enjoyed the trip. Similar to other schools some children had not previously explored heritage sites in their places, and evidence can be seen in their place awareness when in School S2.4 they went climbing towers after the intervention. When children becoming conscious of their physical location, or place-consciousness as (Gruenewald, D. A. and Smith, G.A. 2008) calls it they are developing a sense of place (Basso 1996). Children were making connections to their own heritage and in the process becoming deeply engaged with their local place. This is what engaging in heritage activities does, it creates emotions, experiences and memories that facilitate a sense of belonging and identity which in turn feed into social networks that bind this identity and belonging (Smith 2006). Neither was history found to be boring for the children in the museum, overall they liked history. However, children's interest in heritage declined after the museum workshop. Although the museum children's written data does not show deep engagement with heritage, overall learningful heritage play was present in the museum as it was throughout all the interventions.

### 6.6.1.2 *Sociality/Collaboration*

I made an effort to discuss with teachers the team groupings to allow free choice in teams. However, understandingly so, this can lead to tensions and challenges for the teacher. Therefore, the teachers allocated the team groupings. However, discussion, intersubjectivity and engagement are potentially affected by children not having full choice in who they learn with, and can affect group dynamics. Positive collaboration was evident in all schools but so also was the opposite. However, whereas group work can be collaborative and learningful it can also be isolating for some children, which was evident in the video data. Technology and Minecraft caused arguments in S2.3 and S2.4 which influenced

children’s relationships with each other. Generally, there were low rankings for ‘Working with Teams’ in the Fun sorters. ‘Working with Teams’ was the lowest ranked activity in S2.3 at 26% not liking team work, 18% in S2.4 and 20% in S2.5. Overall there was a decrease in schools post intervention questionnaire to liking working in teams whereas there was an increase in the museum workshop (Table 6.21). The museum setting was more conducive to positive social interaction.

Table 6-21 DC2 ‘I like Working in Teams’ – Comparison across All Interventions

<b>‘I like Working in Teams’</b>	Pre Intervention	Post Intervention
School (N=74)	(N=21) 19y, 1n,1m (N=22) 20y 1 n 1m (N=31) 23y 3N 5M Total 62Y 5N 7M (N=74)	(N= 22) 18Y 3N 1M (S2.4) (N=22) 21Y 0N 1M (S2.3) (N=30) 18Y 4N 8M (S2.5) 57Y 7N 10M (N= 74)
Overall change (-7%)	<b>-5Y +2N +3M</b>	
Museum (N=12)	7Y , 1N, 4M	9Y, 2N, 1M
Overall change (+17%)	<b>+2, +1, -3</b>	

### 6.6.1.3 Engagement, positive affect and fun

Positive affect is crucial for engagement as well as being vital for playful learning settings. As found by Di Blas et al. (2010) engagement and fun are inter-dependent concepts vital to effective learning experiences. Children showed evidence for high levels of enjoyment and fun, they had fun learning about heritage and technology with peers and friends. To the children the project was ‘a funner way of learning’ (S2.4) and ‘funner than school work’ (S2.5). The most challenging aspects were also highly enjoyable. For example making movies is described as a ‘horrible fun’ (M2.6). Children were eager to engage, to learn and to experiment with and without technology. However, all liked learning through interactive technology which augmented their interest in and engagement for heritage learning in all four interventions.



Figure 6-61 DC2 All Schools - What does playful mean to you in your own words?

From the reflection journals from both learning contexts, when asked ‘What does playful mean to you?’ an association with positive affect formed a large part of the responses (67%) (Fig 6.61). Fun accounted for 41% of the responses, being excited, nice, kind happy was included in another 26%. Being adventurous and enthusiastic was noted, as well as being with your friends (18%).

Challenge and positive affect, which together form the cognitive and affective characteristics of 'flow' was evident in all settings. Children showed evidence of being intrinsically motivated. Lunches were forgotten and children wanted to stay in the classroom at break times and continue their work. Although outside break times were suggested, children in the museum often ate at their desks as they worked. Engagement factors as listed by O'Brien and Toms (2008) such as attention, focus, variety/novelty, interactivity, and perceived user control were also evident in the interventions. Engagement and pride hallmarks of a playful learning environment (Mardell et al. 2016) were evident when children presented their final artefacts to peers, parents and friends. Whereas wonder, fun and positive affect was happening as is characteristic of informal learning settings (Sefton-Green 2004) it did not mean the experience was all fun and games. Fun and learning can happen together (Falk and Dierking 2013).

### 6.6.1.3.1 Creative engagement - fact v fiction debate

The different contexts of the school and the museum afforded different opportunities for imaginative creative interpretations of history, and subsequently heritage. Challenges arose between historical fact and fiction. At the end-of-week museum public presentation of children's artefacts one parent commented on the lack of factual object information in their child's presentation. Their child had presented a fictional creative representation of a number of objects. Tensions do exist between historians and museums on how objects should be interpreted, interacted with and presented. 'Experience' and 'Edutainment' are newer forms of museum learning programmes which are not endorsed by everyone in the field. Due care was taken in the schools to comply with curriculum and creative interpretations were based on factual information. However, in the museum, without restrictions, children's meaning making processes were given priority over ensuring they used the 'correct' curated perspective of objects. Important in a play-based approach to heritage education is valuing children's own meaning making and to restrict meanings to official narratives would have decreased long-term heritage engagement in children. These experiences with heritage are ones that embody and engage the child in further learning at some point in their lives. Children can learn official history in school, or archaeology or heritage at third level but they may not ever reach those learning opportunities if they find history and heritage boring. Although Smith (1990) points to potential problems moving from a playful less-structured learning environment to a more formal one in later schooling, if a child has no interest in, or attachment to a subject they potentially will not choose heritage related subjects.

6.6.1.4 Digital augmentation of learning and engagement

6.6.1.4.1 Does technology enhance learning and engagement with heritage?

From the evidence of the questionnaires analysis whether technology and computers make a difference to an interest in heritage and history, the majority of children agreed with both statements (Table 6.22). The questionnaire analysis shows positive increases in history learning and in an interest in history after the intervention. The response to a third statement *Heritage is interesting* increased across all schools, but not in the museum (Table 6.23).

Table 6-22 DC2 VAS Questionnaire – Comparison of Statement Responses

Questionnaires	School (N=74)				Museum
	S2.3	S2.4	S2.5	All	(N=12)
Change post intervention in number of children agreeing with VAS statements below					
<i>Heritage is more interesting when using computers</i>	+4	+8	+2	<b>+14 Y</b>	<b>+2 (YES)</b>
	<b>+2</b>	-8	-2	-8 N	-2 (NO)
	-6	<b>+2</b>	-1	-5 M	0 (MAYBE)
<i>Technology makes learning history and heritage more interesting</i>	+4	+7	<b>-1</b>	<b>+10 Y</b>	<b>+2 (YES)</b>
	-2	-5	-1	-8 N	0 (NO)
	-2	0	<b>+1</b>	-1 M	-2 (MAYBE)

Table 6-23 DC2 VAS Questionnaire- *Heritage is interesting*

Questionnaires	School	Museum
Change post intervention in number of children agreeing with statement	All Schools	M2.6
VAS statement: <i>Heritage is interesting</i>	<b>+6 (YES)</b>	<b>-3 (YES)</b>
	-7 (NO)	<b>+2 (NO)</b>
	-1 (M)	<b>+1 (M)</b>

In S2.3 enjoyment factors leaned towards a large difference between physical heritage exploration and using technology. Challenges with technology impaired full potential engagement in this school, and heritage engagement was through physical embodiment. Whereas research has shown positive impact of iPads on students engagement with learning (Clark and Luckin 2013) it was hard for any of these children to have experienced effective learning through technology given the circumstances. However, this intervention proved invaluable in finding challenges and real-world technological problems that were necessary to understand and address for further interventions in this cycle.

In S2.4 there was a mixed response when asked whether technology enhanced heritage learning. A *'bit of both'* is needed was the response of one boy. Whereas the majority liked using



technology indications are that heritage interactions were favoured. Children realised they could express their learning through building in Minecraft quite well but enhancing their heritage learning could have been through another medium like LEGO. However, after the intervention some the boys in the focus group had increased furthered their interest in heritage through technology, downloading apps and building with Minecraft. This school had a particularly existing high interest in local history and heritage which only changed slightly post intervention.

In S2.5 children were excited about using the iPads and initially did not think about the heritage aspect but found it fun learning about heritage. The technology served as a hook to draw children into the project. One child liked taking photos with the iPad as they helped her remember better. After the project some children had tried different apps at home.

In the museum iPads mediated children's engagement with the museum objects. The literature has shown how using iPads for learning affords children choice and self-direction in their learning (Burden et al. 2019b) and this was the case in the museum. Because children had complete freedom and choice in their learning, it encouraged them to '*learn more*' and provided the conditions for intrinsic motivation and creative learning. *Making a digital story* was the top ranked activity in the museum. Children's focus in the museum from their written data indicates how much they enjoyed technology. Similar to the museum experience in DC1 (Fig. 5.29), children did not realise they were learning, they were having fun with technology and friends. Whereas children's interest in heritage declined as per questionnaire (Table 6.23), evidence of learning and engagement is found in their final digital artefacts (Fig. 6.55).

Through the use of iPads all children developed what Boon et al (2020) found as effective iPad learning - skills in multimodal literacies, team work, motivation for learning, individual learning needs supported, both in and out of the classroom. However, the use of technology in these four interventions were all different. S2.4 and S2.5 had rich archaeological monuments on their doorstep and especially S2.4 were able to critically evaluate whether technology made a difference to their interactions with heritage. If S2.3, with only one main heritage site in their town, had less technological challenges and frustrations perhaps their learning experiences would have been more effective. Therefore, whether technology enhances heritage learning or not is very much context dependant. From these four interventions in this design cycle it can be inferred that although children favoured physical interactions with heritage in two schools the overall children's learning experiences were enhanced by technology and the use of iPads. An optimal design for technology enhancing heritage learning and engagement must include '*a bit of both*' (child participant S2.4, 2017), the physical and the digital.

## Chapter Six Design Cycle Two

What children’s drawings say

*Table 6-24 DC2 Visual Data - Drawings - All Schools and Museum*

Visual Drawings- all Schools							
School ID	No. of Drawings	Heritage	Change from previous school	Technology	Change from previous school	Heritage AND Technology	Sociality
2.3	125	N=104 83%		N=14 11%	-	7 (6%)	
2.4	49	N=30 61%	-22%	N=13 27%	+16%	6 (12%)	
2.5	67	N=31 46%	-37%	N=22 33%	+22%	14 (21%)	
Museum ID							
2.6	13	N=3 (15%)		N= 6 (46%)		1 (8%)	4 (31%)

Visual illustrations can show how the children view the world (Punch 2002), indicate expression and deeper meaning making (Kress 1997). As children had time to think when completing the drawings at home in their reflection journals, I believed it was worthwhile to explore the meanings of their drawings. Children’s drawings were categorised into heritage, technology drawings and where they intersect (Table 6.24). Children also did drawings on their storyboards but these were not included in the analysis. Technology featured at different levels in the different learning contexts (Appendix Z). S2.3 had a high level of interaction with heritage and less so with technology in their drawings. This triangulates with other written and video data from this school which shows challenges and issues with the integration of technology into the project. In S2.4 there was less heritage drawings than the previous school S2.3. There was also a lower number of children interested in technology although there is a percentage increase in interest from the previous school (Table 6.24). As the design progressed and became more seamless there was an increase in technology drawings in the final school S2.5. 33% of the drawings here referenced solely technology. The design was working well in this final school and there were very little issues with technology. As noted earlier there was problems with technology and scaffolding in S2.3 but as the design evolved to S2.4 and S2.5, technology was integrated more seamlessly. Therefore, children become more confident using the technology and it evidenced more meaning for them. Equally as the design evolved the percentage of children drawing heritage AND technology increased. However, the percentages in the last two schools are lower for technology than for heritage even though there was seamless integration with technology in these schools. This could indicate that technology has an influence on a heritage learning programme but not hugely. Overall school drawings show a higher engagement with heritage rather than technology. However, there is an increase in technology enhancement of heritage engagement as the design evolved and became more integrated into learning activities. As is evidenced from the museum children drawing’s there is little engagement with heritage. Drawings indicate engagement with technology and friends. This triangulates with other data where children hold an interest in history

but interest in heritage declined after the workshop. The museum children favoured technology and the affordances it brought them, freedom and fun in making stories and working with friends.

#### 6.6.1.4.2 Challenges with technology

It is well reported in the literature the distractions digital devices can cause (Burden et al. 2019b, Maher 2015). The novelty of having technology in and outside the classroom proved distracting, which was noted by the children themselves in the focus groups. There were arguments and tensions over iPads in all schools but especially evident in S2.3 and S2.4 when playing Minecraft. When S2.4 got a chance in free digital play time to organise themselves and self-direct their learning they became focused and worked well together. The children in S2.3 would have liked to have had more freedom to organise and self-direct their own learning. However, technical challenges included problems with Wi-Fi, lag, and with presenting to class via the whiteboard. These issues prevented the flow of the overall learning experience. Additionally, heritage engagement using technology could have been higher had there been enough iPads to go around for everyone.

#### Scaffolding and supports

Technology must be seamless for it to work well in a classroom. It is very difficult for one educator/facilitator to integrate technology into learning unless it is seamless. It must work. As can be noted in a real setting technology there are many problems, including internet access, supporting



Figure 6-62 DC2 M2.6 Museum Scaffolding

children's own digital learning, of which there are divides in the classroom, and the educator's/ teacher's own confidence in using learning technologies in the classroom. Not all teachers are confident with using technologies, especially games like Minecraft (Nebel et al. 2016). Scaffolding and supports are vital to integrate into any museum design with technology (Andre et al. 2016) and especially when carrying out DST practices with children (Di Blas et al. 2010). Scaffolding and support to the children while using technology was lacking in this design cycle because of a combination of factors. I was a sole researcher and the technological challenges took up a lot of my time. Children in the schools were rushed and this was noted by one child in the focus groups. Not all children had previous experiences with tablets. This makes scaffolding and structured activities all the more necessary especially in the school context where there are children from all social demographics. The museum afforded more time for scaffolding and supporting children in their making processes (Fig. 6.62). Because of smaller numbers present and the fact the museum workshop was held over three days afforded more help for the children.

Development of Digital Story-writing process

'Thinking Of and Writing the Story' was an existing problem from DC1. Coming up with ideas was the difficulty, not the act of writing itself. In S2.3 where technological challenges prevailed, attention to story writing was reduced. Afterwards, when I discussed events with the teacher the brainstorming activities to spark imaginative ideas were deemed too abstract and consequently this activity was amended for the next school. Evidence of low engagement with writing was displayed in the Fun Toolkit where it was ranked in the bottom two activities. Neither were children eager to 'Write a script' again in the Again-Again Table, 13% saying they would do it again and 35% saying NO.

In the following school (S2.4) there were difficulties with ideas, the storyboard template and

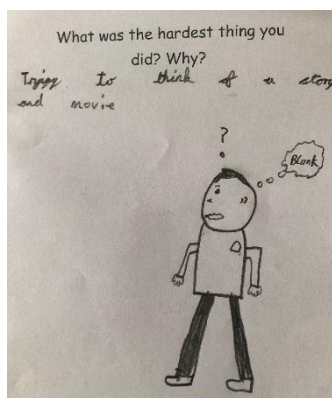


Figure 6-63 DC2 S2.4 Story Writing - Drawing a Blank

the writing of stories (Fig. 6.63). The novelty of the iPads and the technology was almost too exciting for the boys. It was difficult to get them as a class to focus on the story writing (see Fig.6.30 for example). The literature has shown how sharing experiences and narrative with each other helps develop knowledge (Liguori and Bakewell 2019) and with the help from the teacher a more whole class form of brainstorming was carried out. Each team shared their ideas and possible narratives, clarified what app they were using (e.g. Minecraft for screenshots) and how exactly they would execute their plans. Post-

it notes were introduced in S2.4 and it became easier to move ideas around physically rather than through writing and editing. Story planning became more 'oral'. However, although there was evidence of not liking storyboarding and the activity, 55% of boys said they would 'write a script' again. However, the activity had the highest amount of NO's (32%).

In the following school (S2.5) the storyboarding process was improved with the children preparing stories before the intervention, resulting in teachers' groupings of girls with the same story interests. By now, there was more structure in the story writing process. Children brainstormed their story ideas and each child pitched their idea to other team members for a set time. Before children went on the field trip they had more clarity, and had time to reflect on their evolving story while on the field trip. Post-it notes were used by all teams in the formation and discussion of ideas, this strategy was deemed successful and an optimal design for story-writing (Fig. 6.64). At this stage of the design 50% said they would write a script again with only 20% saying NO. The story-writing process at this stage held more clarity and less confusion for the children. The quality of narrative was high in this school (S2.5) across the board, perhaps due to preparation in advance and getting the storyboarding process to a place that worked.

In S2.4 the teacher had acknowledged had he known more what the project entailed the class would have done more preparation. However, if the learning was in the process, the quality of the final artefacts should make no difference. Papert believed children should learn *through* working on projects rather than *before* working on projects. In short, children are learning and problem-solving while they are actively engaged in projects as opposed to being taught concepts before a project (Resnick 2020).

In the museum '*Making a digital story*' was the top ranked activity in the museum. Although the story process was found difficult by 3 children (25%) '*Thinking of and writing the story*' was the ranked first favourite activity by 4 children (33%) and in the top two favourite activities by 8 children (67%). This was much improved from the school numbers where, it was ranked in the top two favourite activities school by 4 children S2.3 (17%), 1 child S2.4 and 1 child in S2.5.



Figure 6-64 DC2 S2.5 Story-writing Process

### 6.6.1.5 Playful learning

#### 6.6.1.5.1 The potential of a play-based approach in heritage education

Many characteristics of play have been noted in the literature (ref. Table 3.1). It was important in the play-based approach of this thesis that these play characteristics were embedded in the learning design and environment. The involvement of children had to be voluntary, they had to want to do the activities and be present. Therefore it was necessary to ensure the environment was enjoyable, cosy, and children felt comfortable. A non-stressed atmosphere provides the conditions for a non-stressed frame of mind, therefore affording spontaneity, joy, humour, all which in turn foster creativity and flow. This was harder to achieve in a school setting when I did not have full control of the set-up, but the project showed how an experiential informal way of heritage learning is possible to incorporate into a school set-up.

In the Pedagogy of Play's playful learning indicators, previously detailed in the literature review (Fig. 2.2) and in DC1 (Table 5.10), indicators are categorised under three overarching themes: DELIGHT, CHOICE and WONDER (Mardell et al. 2016). Many indicators were evidenced in this cycle and transversed into the other TECHe lenses of engagement framework (digital augmentation, sociality and engagement). The evidence from the design cycles shows how these playful learning

indicators, although different in every learning context, were present in the interventions. This design cycle showed evidence that when playful learning indicators interact with heritage there is potential for deep learning and engagement.

In the context of this thesis, DELIGHT and its indicators were important to implement in the evolving design. A question in children's reflection journals asked 'What does playful mean to you?' Children believed being playful was predominantly having fun, and also being kind, friendly, nice to others, happy, excited, adventurous and enthusiastic. Being with others and friends, being active, imaginative and creative, '*able to enjoy work and play*' (child M2.6) validates the play-based approach of this thesis.

CHOICE is another characteristic that emerged as essential to engagement. Choice was easier to facilitate in the context of the museum. 'Making a digital story' was the favourite activity in the Fun Sorter for the museum children, which in turn increased the 'likeability' of story-writing. Being able to move freely around the museum, having total freedom in selecting objects and interpreting them, with no requirements to curriculum meant total freedom for the children. Whereas the school children did make creative artefacts they were limited by the little time we had out on site. As school children prepared stories or talked about the intervention pre-visit it was under the framework of curriculum with the teacher present. The children in the museum could creatively interpret objects of their own choosing. This leads to ownership, intrinsic motivation and empowerment, all playful learning indicators and all necessary for deep learning.

WONDER is the POP's third overarching theme that covers engagement, challenge, curiosity, novelty, fascination and surprise (Mardell et al. 2016). These indicators were evidenced in the data. Minecraft and iPads were a novelty for the children causing excitement as well as challenges. To some children the field trip was a novelty, some had never visited their local sites before. Challenge and positive affect were evident together in many flow experiences. From the evidence of the children's written data there is ample evidence for fascination and surprise, and developing curiosity about heritage.

When asked '*What was playful in the project?*' each context evidenced different playful aspects (Fig. 6.65). In S2.3 the physical field trip was most playful, followed by the fun of Minecraft, making movies and the iPad in S2.4. In S2.5 the most playful was making movies while in the museum children found the people aspect playful. Overall technology, friends and the physical field trip were deemed the most playful. One child defined what playful meant to her as being '*humorous, light and energetic*' which describes well the ethos of a what should be included in a learningful heritage play experience.

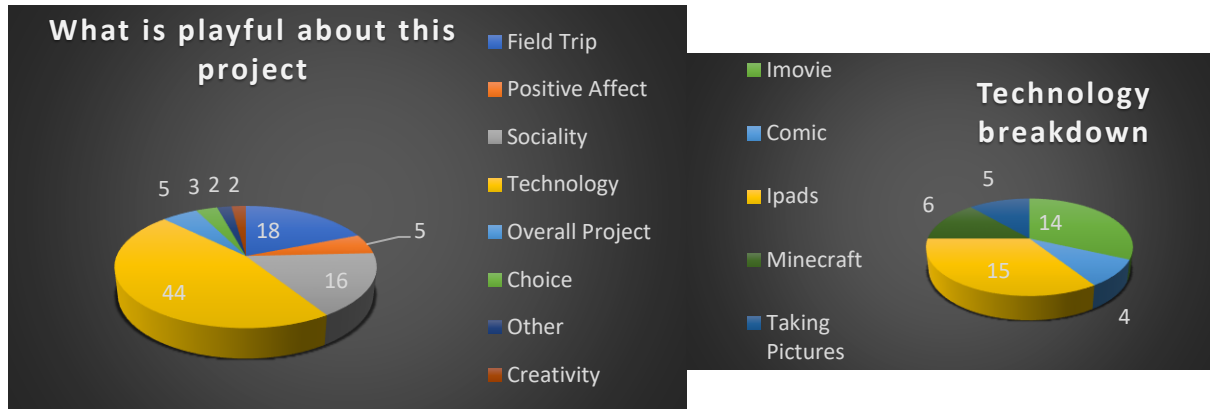


Figure 6-65 DC2 What was Playful about this Project? N=95 UOMs

#### 6.6.1.5.2 Striking a balance between free play and guided play

Research has shown learning happens when learning is playful, when children's curiosity is aroused, when they have fun, freedom, choice and voice. However, one of the main design tensions is getting the balance right between free play and structured play. In free play children have full choice and complete creative freedom in their learning, benefiting their social and emotional development. As has been evident using Minecraft in DC1 and in DC2, where some children use the game to blow up other's worlds causing stress to other children, free play comes with a price within a school environment. Not every child is disciplined to use the game for learning subject matter, and as playing any kind of video games is a novelty in the traditional classroom, one can understand how some children would use this learning opportunity to alleviate their boredom with school. Tensions like this were a cause for concern in the formal learning environment.

An optimal design for Minecraft was realised in S2.4. There were major constraints at the start of the project in S2.3. In S2.3 on one hand the intervention could be termed organised chaos, and on the other hand free play. Free play is central to a child-centered curriculum and benefits learning (Wood 2013). Amidst the chaos children can and did learn and they did produce digital artefacts. However, it was a drawback being a sole researcher and this did affect the intervention. With help from volunteer research assistants in S2.4 this allowed me more time for scaffolding and support and finding the right balance between free and guided play. Although free play brings its own tensions such as chaos, noise etc. it was key to evidence successful heritage learning and engagement in Minecraft. When children in S2.4 were given free digital play time, teams self-directed their own learning, collaborated of their own free will, which was a turning point in their heritage learning and engagement. In S2.4 an optimal learning design for Minecraft was reached. Coupled with an improved story planning process from S2.3 to S2.4 there was higher quality and detail in the digital artefacts

made with Minecraft. The factual requirements of the curriculum were met for the teacher as well as the creative engagement the iPads and Minecraft afforded.

The positive affect associated with the freedom while learning outside of the school environment was obvious in the data. It was a 'funner way of learning' (child participant S2.4). Back in the classroom timetables, had to be adhered to as well as the overall structure of the project itself. However, when given opportunity for free digital play within the formal school environment, flow was evident in the data and children did not want to take breaks (S2.3 and S2.4). However, there were challenges as evidenced in the video vignettes. At times, during free play there is chaos. Chaos included children being noisy, not sitting in their seats, freely moving, talking, arguing, laughing etc. However, learning was happening and is evident in the data in all cycles. The tension between free play and guided play will always be present in a playful learning environment. Trying to find the right balance between delight, choice, wonder and traditional learning set-ups is an issue when enabling play in a classroom or a museum. Understanding the children are learning through chaos is important for an educator to know; understanding when the balance is not right and being able to adjust accordingly is equally important.

### 6.7 Chapter Summary

The cycle, the principal study in this DBR research showed the evolving stages of the design in implementing a technology-enhanced pedagogical approach to enhancing engagement with heritage education. The cycle built upon the pilot of DC1, which was carried out in one school and one museum. In this cycle, DC2, workshops were carried out in an additional three schools and one museum. The data was analysed under the *TEChE* theoretical framework: materiality, sociality, digital augmentation, engagement and playful learning. The combination of all these theoretical characteristics can be termed 'Learningful heritage play' and is considered the optimal design for heritage engagement. Following on from the evolving design sensitivities in DC1 the final *TEChE* design model, its sensitivities and design informants are detailed and discussed in the following chapter seven.



## Chapter 7 TEChE Design Model

This chapter details the criteria underpinning the design of a learningful play pedagogy to enhance children's engagement with heritage. Within each of the five criteria are a 'empirically-founded' design sensitivities that can be adopted and adapted by others (Table 7.1)(McKenney and Visscher-Voerman 2013). Together they form the *TEChE* model for learningful heritage play (Fig. 7.2). The criteria for the *TEChE* model are based on the *TEChE* framework (materiality, digital augmentation, engagement, sociality and playful learning). The model has evolved over DC1 (two interventions) and the principal study of DC2 (four interventions). The *TEChE* design model additionally lists key design informants and resources which are necessary for a successful enhancement of children's engagement and learning with heritage. The *TEChE* model is what McKenney and Reeves (2012) call a prototype model. Its purpose is to be tried and tested in similar learning contexts by others. In the following chapter this model was adopted and adapted for an international museum context.

Within McKenney and Reeves' (2012) own model for design research visualised in Fig. 7.1, the model shows how an integrated cycle of research, design activities and outputs interact with practice (McKenney and Visscher-Voerman 2013, p. 14). Each shape on the visual diagram represents a concept:

- squares - three phases of research and development activities
- rectangles – two outputs of research (proximal and distal)
- triangle –interaction with practice- increasing as project grows (McKenney and Visscher-Voerman 2013).

In this iterative model for educational design research, there are two outputs - proximal (maturing intervention) and distal (theoretical understanding). The proximal is the practical output, the design intervention, which may be a process, a product or a combination of both (McKenney and Visscher-Voerman 2013). In the *TEChE* model the proximal output is the design intervention: the inner workings of the design, the description of the research design, framework and the theories of the process within authentic learning settings. The distal output is the set of 'empirically-founded' design sensitivities that can be adopted and adapted by others (McKenney and Visscher-Voerman 2013). In the *TEChE* model the distal contribution is the set of design sensitivities (DS) set out in Table 7.1 and design informants outlined in section 7.2. These DS's partly address the second supporting research question of this thesis *What are the core design features of a creative learning model for heritage*

engagement? The question will also be wholly addressed after DC3 due to adapting the *TEChE* model in a different learning context, therefore another set of DS arose after the DC3 intervention. This is outlined in the final chapter 'Conclusions' (No. 10).

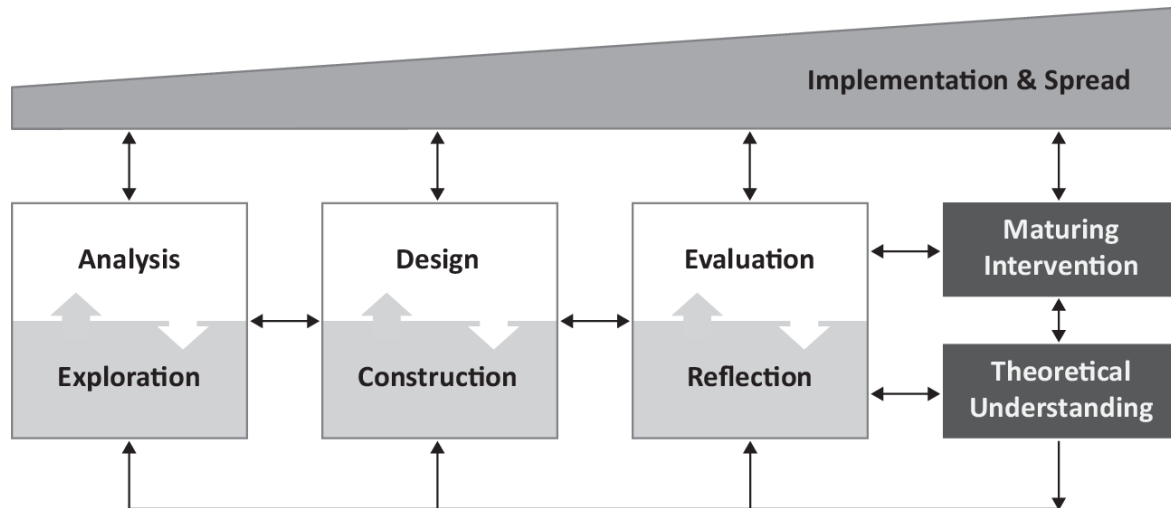


Figure 7-1 Generic Model for Design Research in Education (McKenney & Reeves 2012)–with permission

### 7.1 Design Criteria

The following are the five main criteria and the details the twelve design sensitivities (DS) for the *TEChE* framework (Table 7.1). They reflect the school/museum cross-over in-situ learning environments from which they were developed, an important aspect of design research. Each DS is colour coded to reflect the category to which it belongs, although there are interrelated concepts throughout.

Table 7-1 *TEChE* Design Sensitivities

Design Sensitivities: Learningful Heritage Play Pedagogy		
Cultural Heritage and Materiality		
DS1	<b>Authentic Learning Environment</b>	<ul style="list-style-type: none"> <li>○ Making connections through a physical concrete experience with local heritage and place</li> <li>○ In-situ activities should be visual/experiential rather than textual, easy to understand and to do - experience activities must be hands on and minds on</li> <li>○ Allow freedom in the museum to interact with objects</li> <li>○ Facilitate children’s own meaning-making</li> </ul>

DS2	<b>Material culture as starting point for engagement</b>	<ul style="list-style-type: none"> <li>○ Harnessing children’s everyday engagement. Support children’s interests to foster intrinsic motivation</li> <li>○ Factual versus fictional options are context dependant. Foster creativity through imaginative representation</li> <li>○ Archaeological and historical content to be age-appropriate level</li> </ul>
<b>Digital Augmentation</b>		
DS3	<b>Supports &amp; Scaffolding</b>	<ul style="list-style-type: none"> <li>○ Support children’s digital literacies and fluency for seamless integration of technology into the story making process</li> <li>○ Offer feedback, technical support and guidance</li> </ul>
DS4	<b>Free Digital Play</b>	<ul style="list-style-type: none"> <li>○ Facilitate exploration and experimentation with apps and iPads</li> <li>○ Support open and creative interpretation in digital creations</li> <li>○ Support collaboration and social interaction</li> </ul>
DS5	<b>Ubiquitous technologies</b>	<ul style="list-style-type: none"> <li>○ Use low-threshold easy to use, free applications. Keep it simple</li> <li>○ One iPad between two children is the optimal choice</li> <li>○ Children should create a public entity but encourage process over product</li> </ul>
<b>Engagement</b>		
DS6	<b>Engagement</b>	Provide cognitive and affective conditions to provide opportunities for optimal flow experiences
<b>Sociality</b>		
DS7	<b>Dialogue and Discussion</b>	<ul style="list-style-type: none"> <li>○ Provide opportunities for co-construction of knowledge</li> <li>○ Support the making of connections and fostering of a sense of place, identity and belonging</li> </ul>
DS8	<b>Positive team collaboration</b>	Facilitate friends in teams or groups that work well together
DS9	<b>Sharing with Peers</b>	<ul style="list-style-type: none"> <li>○ Encourage sharing for developing creative learning process skills and encouragement from peers</li> <li>○ Encourage public presentation of artefacts</li> </ul>
<b>Playful Learning</b>		
DS10	<b>Positive Affect</b>	<ul style="list-style-type: none"> <li>○ Fun, joyful, enjoyable, voluntary, non-stressed learning</li> <li>○ Encouragement of free creative expression</li> </ul>
DS11	<b>Guided &amp; Free Play balance</b>	<ul style="list-style-type: none"> <li>○ Maintain a balance between free play and guided play. Children should be able to move freely, context dependent</li> <li>○ Provide scaffolding and supports allowing freedom and flexibility</li> </ul>
DS12	<b>Child Autonomy and Agency</b>	<ul style="list-style-type: none"> <li>○ Self-directed and independence in learning</li> <li>○ Freedom to move, voice and choice</li> </ul>

### *7.1.1. Cultural heritage and materiality*

In this hybrid physical-digital heritage learning model, a **physical concrete experience** with local heritage /museum objects and place is necessary. The material culture such as objects and sites that children encounter become **entry points** for children's engagement with heritage. In addition **harnessing children's own interests** will facilitate positive affect and engagement. These two guidelines aim to ensure place-making or making connections to local heritage fosters well-being, sense of belonging, place and identity; fostering shared understandings of place and enhancing children's sense of place. Heritage interactions should be dynamic, non-linear and fluid and open to interpretation and children's own meaning-making, changing as one moves on the continuum between intangible (making meaning) and tangible (physical) forms (Fig. 3.2). Different forms of heritage interactions will depend on the learning context, but experiential learning in a novel authentic environment such as out in place or in a museum will ensure a deeper connection to place and heritage.

### *7.1.2. Digital augmentation*

Design criteria for technology include many interrelated features. Technology supports learning and subsequently engagement affording rich learning experiences for children. It provides novel and creative new ways for children to learn. Digital augmentation affords newness in the everyday classroom and this can be harnessed for the benefit of heritage learning and engagement. The digital aspect of the design should not focus on the technology per se but on what can be done with it, e.g. collaboration with others, enhancing the engagement of subject matter, cultural heritage meaning making and the creative story-making processes, communication of, and the presentation of children's works and artefacts. It is important technology is **easy to use**, free if possible and adaptable to the learning context. Technology will support learning of heritage but it can be challenging. Technological affordances and constraints may not be the same in every learning situation. To save arguments and team tensions the optimal **sharing of iPads is two people together**. To make the process smoother for children **keep it simple** in the use of technologies.

For seamless learning experiences technology should **be scaffolded and supported** and be built into the activities. In order to fully engage with the heritage learning experience children need to **develop digital literacies and fluency**. This affords seamless integration of technology into the digital story making process. Although the creation of a digital artefact is core to constructionism, and is the end goal for the children, the embedded processes of creating and making around the subject matter of heritage/place is the aim, rather than a honed digital artefact requiring a steep digital learning curve for children. A balance between heritage and digital learning will be dependent on the context and the support the educator/facilitator has within the learning programme. There is a danger

technology can hinder engagement rather than aid it, therefore scaffolding is important. The educator/facilitator should be in a position to **offer guidance to the child**, but if needed seek outside volunteer help. Many technology/engineering companies offer Outreach programmes and may offer assistance if asked.

There should be time available for **free digital play**. The importance of this uncontrolled time allows the children to **explore, experiment with technology**, self-direct and organise their learning in their own way. There will be children who will ‘mess’ and e.g. ‘grief’ in Minecraft, therefore within Minecraft, TNT (as suggested by a child in S2.3) allows children time to get it out of their system before returning to more structured digital play. TNT (Trinitrotoluene) is the explosive used in Minecraft and adapted by a child in S2.3 to mean *Ten Minute Time* for free digital play. However, perhaps thirty minutes may be more appropriate.

The creative use of technology should enhance learning of history, heritage and place in novel ways that are enjoyable for the children, increasing interest in subject matter by offering rich informal and formal learning experiences. **Open interpretation and creative digital ways** of representing knowledge should be encouraged. Within playful learning spaces where children feel good and are with friends, knowledge and social relations between children become embedded. The design guidelines for digital use should support playful and creative interactions and **augment rich social interactions especially collaborative and participatory learning**. In this way children will better engage with each other and with subject matter. Digital augmentation affords more authentic, social, or situated learning opportunities which gives children new ways of meaning making. In the classroom, digital practices should increase motivation and classroom engagement and support generation of knowledge. Digital augmentation should enhance engagement with cultural heritage and material culture, within the locality, in heritage sites and museums, developing awareness and understandings and curiosity about place.

### *7.1.3. Engagement*

Engagement is core to this thesis. Some of the criteria for engagement are included in the other criteria, therefore what is focused here is on the concept of providing the right conditions to foster flow. Each criterion affects engagement. In order to have full engagement the right conditions for playful learning, technology use, children’s own interests, and active participation with friends need to be optimised. When this happens, engagement is operating at its fullest capacity. To aim for flow, provide playful learning, choice for children, self-regulated learning, include children’s interests, and foster an atmosphere of enjoyment. Flow moments of ‘being in the zone’ foster motivation, learning and engagement. As per flow theory by Csikszentmihalyi (1990), provide meaningful challenges that are doable, not too easy or too difficult. When the cognitive and affective domains voluntarily meet

flow will be present. It is a difficult perhaps to get all criteria working together but when it does the child is fully absorbed and deep learning is happening (Csikszentmihalyi 1990).

#### 7.1.4. *Sociality*

Learning is social (Vygotsky 1978). The model should encourage **social interaction, collaboration and connectedness** between peers. When children interact and communicate with others they are learning from each other (Mercer and Howe 2012). The social dimension is vital to a child's Zone of Proximal Development. A sense of connectedness to others is essential for academic motivation as well as helping develop shared understanding of place and facilitating children's sense of place. Therefore a dialogic approach, where through discussion, debate and interactivity children can collaborate and get feedback, they are making connections to each other and within their culture constructing knowledge (Vygotsky 1978).

Whereas the digital will in its own right augment the co-construction of knowledge, research suggests that conversations at museums contribute to, as well as serve as evidence for, learning (Hohenstein and Tran 2007) and consequently knowledge building. Although collaborative dialogic activity with subject matter is rarely incorporated in the classroom (Mercer and Howe 2012) this could be incorporated with children and their friends. Children are happy when they are with their friends (Rubin et al. 2008) and they will learn through social interaction. It is recognised choosing groups can cause tensions in the school classroom for teachers. However, friends are important in the engagement process and if possible children should be allowed **self-select groups together**. Equally peers influence children and their opinion counts. Peers are 'powerful socialization 'agents' who contribute to other children's cognitive, social and emotional development (Rubin et al. 2008). **Sharing ideas and processes with peers** helps children develop their ideas in a creative spiral of learning (Resnick 2007a, Lucas 2013).

#### 7.1.5. *Playful learning*

In the Pedagogy of Play from Project Zero (Mardell et al. 2016) playful activities are categorised under three categories *Delight, Choice* and *Wonder* (Fig. 3.3). Positive Affect includes many of the characteristics of *DELIGHT*. Positive affect can be enjoyment to excitement to fun. Fun and learning can go hand in hand. **Positive Affect** is core to engagement and learning and the development of children's creative capabilities and habits of mind. In turn, positive affects enhances creativity, important for children's creating, sharing and public presentation of their digital stories and artefacts. By fostering children's interest, providing the right learning conditions where children feel safe, not judged by peers and where risk is encouraged, creativity and **creative expression** will flourish.

Free digital play was outlined in the digital augmentation section. Equally **free play** without the digital aspect is important for children to socially interact and have physical freedom to follow their curiosity, their passion and move around to do so. Whereas this causes tensions in schools, this free time of play is important for fostering the right conditions for more **guided playful learning**. This can look like 'Not sitting in a seat' (Fig. 5.30) when in school, or roaming the museum galleries with friends. Many of the characteristics of free and guided play can be found in the POP's *WONDER* category e.g. challenge, improvising, taking risks, learning from mistakes.

**Agency and autonomy are closely related.** Whereas student autonomy is vital for engagement (Ryan and Deci 2000, Skinner et al. 2008) it is also vital within a playful learning environment. Within a playful learning environment, and its 'messy' non-linear nature of learning there should be active participation by children with opportunities for experimentation, exploration, interactivity, self-expression, spontaneity, meaning making, digital and non-digital play, and fostering of self-efficacy. It is important participation is voluntary by the children, they must want to be there and be included. Children should have freedom **to choose**, initiate and control their learning, self-choose activities, feel confident to openly and creatively heritage interpretations, self-direct their own learning and to follow their own fascinations. Scaffolding and supports should be available, but allowing **freedom and flexibility**. Equally **children's voice** is valuable to any learning design. Their feedback and suggestions on how a design can be of more relevance to them is important for them to feel ownership of the project. In the context of the museum children must have the freedom to wander in a museum although there are ethical tensions of potentially photographing other people or culturally sensitive material (Maher 2015). Additionally there are tensions in children making noise in the museum and how that is perceived by staff and other visitors. However, these should not serve as discouraging features but can be discussed with children at outset of learning experience where they could make their own rules regarding any issues. In schools every effort should be made to encourage movement to provide opportunities for social interaction. Similar to the *CHOICE* category in the POP model, characteristics ownership, empowerment, making and setting rules, moving around are all relevant to the design criteria for the *TEChE* model.

## 7.2 Design Informants

In order to design a successful model for heritage engagement there are certain conditions that should inform the design. These eight elements are outlined below.

### **Children's voice**

Children's perspectives are important to the design. After each iteration it is recommended to ask children for their opinions on how the design can be made more relevant to them as well as what worked for them and what did not. It is equally important to follow through on their recommendations and to integrate into the following iterations of possible.

### **Curriculum based learning experience**

Activities and strategies should link to the official school curriculum and to a constructivist child-centered interdisciplinary learning approach. Constructivist learning should draw on active, hands on and experiential, authentic (real life and the real world making), and situated learning strategies.

### **Wider professional heritage context**

The design draws on the ethos of the Heritage Council of Ireland and its understandings on heritage and place and their benefits to society. In turn the Heritage Council of Ireland is actively involved in the wider European network of heritage and cultural organisations.

### **Learning spaces**

The physical requirements of learning spaces are important in a design for playful learning. Whereas the school has control over how a classroom is laid out, it is recommended tables are put together for teams and there is room to walk around. In the museum, the space should be homely, have art and stationery supplies etc. freely available, and an alternative layout to table and chairs. In this design bean bags were available for the children. The learning spaces for the hybrid-digital design should foster a playful disposition in children, building creative capabilities and habits of mind. A supportive learning environment that is enjoyable and offers choice in learning, facilitates meaningful activities and doable goals and challenges will engage a child with heritage.

### **Local school and museum perspectives**

The research must be sensitive to the requirements and needs of the individual schools. Each school environment is different depending on local contexts. Each principal and teacher are different and the design must be discussed and if needed adapted to suit the school requirements. In the museum, the



research process should be discussed with the staff, and if possible staff included in e.g. a museum tour. The staff should be invited to any public presentation and any write ups on the design should be respectful to the museum and its existing learning programmes.

### **Collaboration**

Collaborate with local tour guides in providing an introduction to children's field-trips or museum tour. Discuss with tour guide in advance the programme so that their tour fits in with the ethos of the evolving design. External companies can help with technical support and set-up for integrating Minecraft in particular. Many companies have Outreach programmes and these community resources should be utilised.

### **Ethical issues**

Regularly check children are happy with the research process. Everything should be regularly explained to them during the process and any problems or issues they may have should be taken into consideration.

### **External validation**

Teachers serve as critical friends who can inform the research and offer understandings of the problem (McKenney & Reeves 2012). The feedback and objective views of the teacher can be insightful to the design. It is recommended to ask advice before during and after an intervention and include in following iterations. Equally if there are opportunities to ask parents/guardians for their feedback and input this should be considered.

### 7.3 TEChE Design Model

The five design criteria and twelve design sensitivities as detailed in Table 7.1 are illustrated below in the *TEChE* model, Figure 7.2.

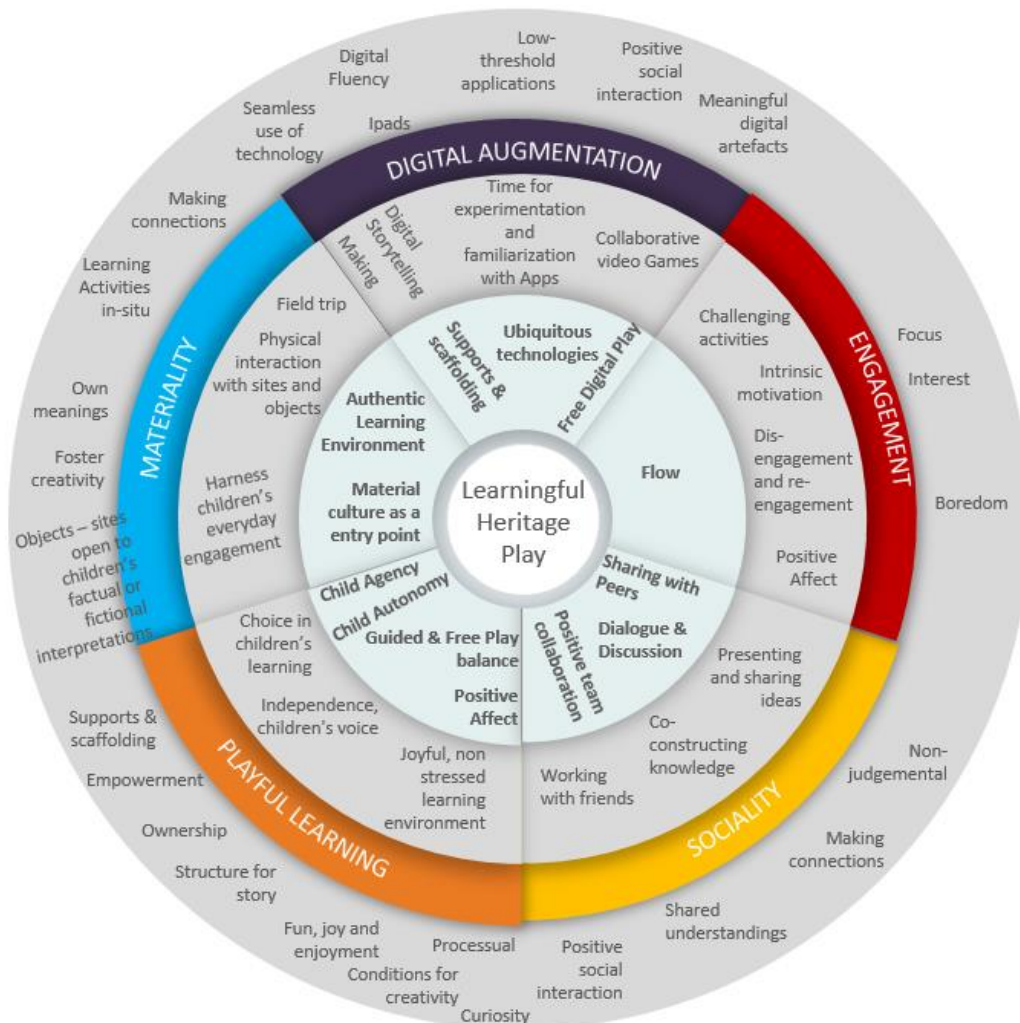


Figure 7-2 TEChE Model for Heritage Engagement across Formal and Informal Settings

### 7.4 Adapting the Model

The Fulbright fellowship as outlined in the Introduction chapter gave me an opportunity to test out and transfer the model to an international context within the Ph.D. research albeit challenging in its own right (McKenney and Schunn 2018). Although the context was different in significant ways to the previous learning contexts, the design prototype, incorporating DC1 and DC2 fitted in with the playful learning ethos of the Exploratorium. This additional cycle (DC3) would allow me extend my ideas within a learning context that values interactivity, arts and creativity equally with STEM, and where the learning environment holds equal weight between science, art and human perception.

There is a noted lack of understanding on what educational designers do in the sphere of educational design research and a lack of research into their design processes (McKenney and Schunn 2018). By adapting an Irish contextual model to a different context afforded me the opportunity to

reflect on how a design travels and to extend understandings on the role played by educational designers (McKenney and Schunn 2018). By describing the processes of adaption, the elements that transferred well, the limitations, issues and challenges, afforded me as a design researcher an opportunity to add insight to, and to create additional knowledge within the educational design process. This can be of support to other design researchers.

In the course of a Ph.D. many researchers design a model but may not get the opportunity to try the final model out in a different educational context or have their findings used to inform practice. Pieters and de Vries (2008) have noted the crisis in educational research and the frustration of many researchers whose findings are rarely employed in educational practice. Projects rarely 'live on past the lifecycle of single projects' (McKenney and Schunn 2018, p. 2). This research–practice gap in how the knowledge from research is shared has been highlighted by McKenney and Schunn (2018) and Pieters and de Vries (2008). The ultimate goal of education designers is for the inclusion of research insights in learning and teaching practice (McKenney and Schunn 2018), yet there is a lack of support for educational research designers and recognition in the educational research literature. DC3 contributes to this gap in DBR methodology.

### 7.5 Chapter Summary

This chapter detailed the criteria underpinning the design of a learningful play pedagogy to enhance children's engagement with heritage. The *TEChE* design model with its set of design sensitivities and design informants were based on the framework of materiality, digital augmentation, engagement, sociality and playful learning as detailed in chapter three. The *TEChE* model has evolved over DC1 (two interventions) and the principal study of DC2 (four interventions). Central to DBR's purpose is the transferability of a design model to another learning context. In this following chapter this model is adopted and adapted in an international museum context. In McKenney and Reeves' (2012) iterative model for educational design research, there are two outputs - proximal (maturing intervention) and distal (theoretical understanding). The proximal output of the *TEChE* model is the design processes carried out over the previous six interventions in natural learning settings. The set of design sensitivities and informants are the distal contribution. These partly address the second supporting research question of this thesis *What are the core design features of a creative learning model for heritage engagement?* The question will be wholly addressed after the completion of DC3. In the following chapter eight, the intervention (DC3) where the *TEChE* model is tested and adapted is detailed, followed by chapter nine on the model's adaptation.

## Chapter 8 Design Cycle Three



Figure 8-1 The Exploratorium Museum of Science, Art and Human Perception, San Francisco, U.S.A.

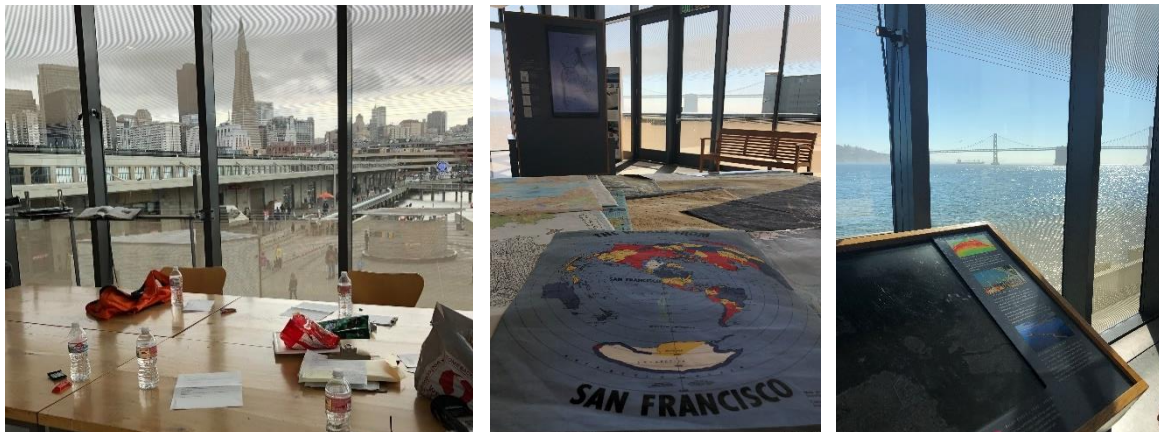


Figure 8-2 DC3 M3.7 Fisher Bay Observatory - Exploratorium Museum, San Francisco

As detailed in the introduction chapter this cycle (DC3) took place at the Exploratorium Museum of



Figure 8-3 DC3 M3.7 Exploratorium Museum Ethos –An Eternal Cycle of Curiosity

Science, Art, and Human Perception in San Francisco, U.S.A. as part of a Fulbright Creative-Ireland Museum Fellowship (Fig. 8.1). By the end of DC2 I had developed a working model (TEChE) for heritage engagement. DBR models aim to be adapted and transferred to new learning contexts. Therefore when I was given the opportunity to carry out research in a setting that reflects my own learning ethos (Fig. 8.3) I decided to explore how the model could be localised in this different cultural context.



Figure 8-4 DC3 M3.7 The Exploratorium Explainers

In the context of the museum departments the project was based within the Fisher Bay Observatory (Fig. 8.2) whose exhibits and programmes focus on direct observance of the geography, history, and ecology of the San Francisco Bay region (Exploratorium Museum 2019a). Eight participants took part in the study every Saturday over a period of seven weeks. The high school diverse participants were aged between fifteen to eighteen years and worked in the museum as ‘Explainers’ (Fig. 8.4), their job to engage visitors with the exhibits, run demonstrations, building their own skills as they help others (Exploratorium Museum 2019b).

Although participants and myself used cell phones to carry out some place-based activities, send images for printing, record their 30 second art work videos, this cycle differed from the previous two design cycles in that it was carried out without the use of computer technology (iPads) and the



Figure 8-5 DC3 M3.7 Creative Expression of Place (DNA Chromosomes)

construction of digital artefacts. The Explainer department offered the use of their iPads but there were restrictions in downloading applications, therefore I made the decision not to include the iPads and concentrate on the creative arts aspect of engaging with place (Fig. 8.5).

‘Arts’ can be defined as ‘any creative or interpretative expression (whether traditional or contemporary) in whatever form...and includes any medium when used for those purposes’ (Arts Council of Ireland 2016). Technology has other forms other than computer technologies and it can be thought of as ‘creating tools that can transform thinking and learning’ (Hoadley and Van Haneghan 2017). Therefore the main

mediating tool with place became what was once a form of new ‘technology’, a pen, pencil and paper. These simple low-tech tools ‘crayons, watercolors, and paper’ can encourage youth to enrich their inner capacities and allow them make sense of the world (Resnick 2006).



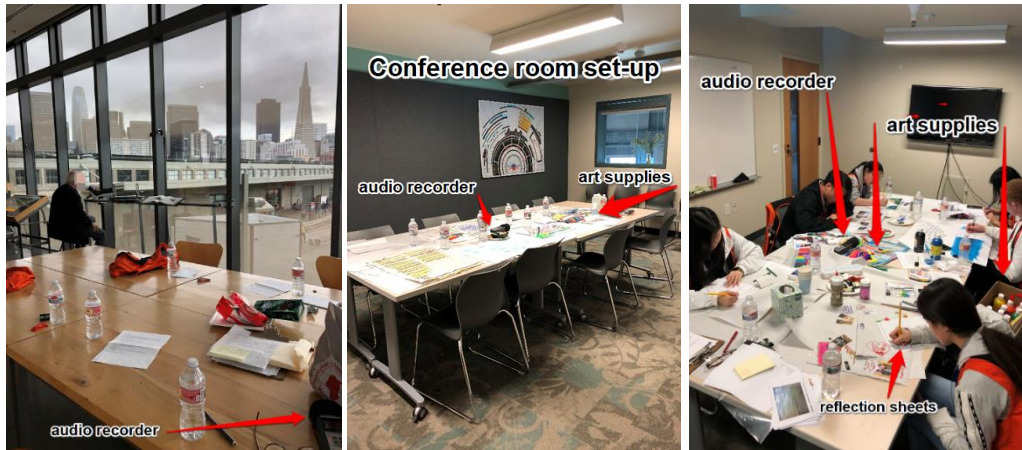


Figure 8-6 DC3 M3.7 Weekly set-up sessions L-R: Fisher Bay Observatory, Conference room, Explainers - teenage participants

Ethical considerations were discussed with museum staff and permission was granted by the High School Explainer department to carry out the project. The department set time aside within the teenager's working day for those that volunteered for the project and provided a space for us to meet (Fig. 8.6). A strong ethical awareness was upheld during the project. I asked young people for their permission to take images. I reminded participating teenagers they could leave at any time and that participation in the final video of their artefacts was not obligatory. I asked their permission to audio record the sessions. I explained about transcriptions and how the data would be anonymized. I printed out an agenda each week (Fig. 8.7) as well as a three to five question questionnaire for completion at the end of each session (Appendix AA). Participants were encouraged to contact me via SMS or email with any concerns or questions.

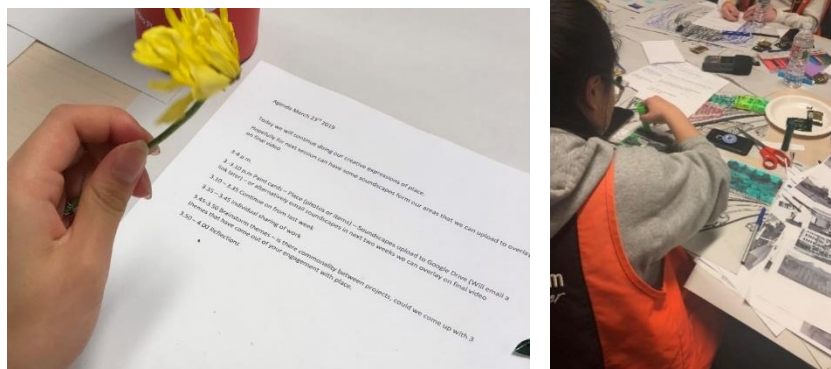


Figure 8-7 DC3 M3.7 Weekly Agenda and Working Area

## 8.1 Project Layout

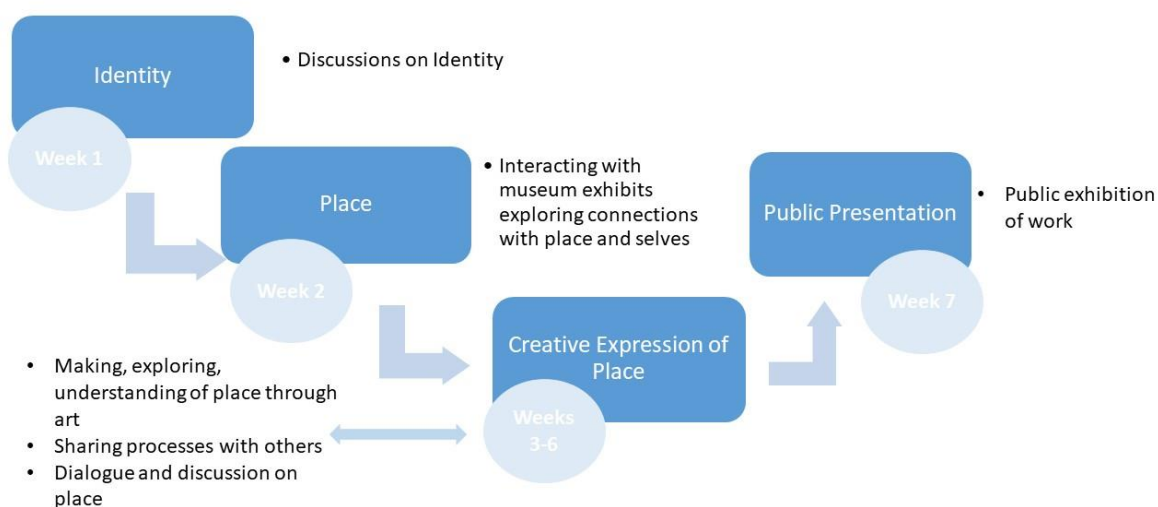


Figure 8-8 DC3 M3.7 Seven-week Project Plan

### 8.1.1. Week one

I introduced myself and explained about my Ph.D. research in Ireland. I asked the Explainers if they might introduce themselves and thanked them for volunteering for the project. I explained about the project plan (Fig. 8.8), that it may be ‘messy’ and unclear at the beginning but that it would become clearer at the end. I explained how we would look at the concept of place and engage with the creative arts to express our understandings and the project would culminate in a public presentation which would evolve out of our weekly sessions. For our first exercise I asked them to think about and write approximately five words that might describe their identity. After asking if they were comfortable sharing their words we discussed identity, community and place further. One aim of the written exercise was to see if anyone identified with their physical place and if so why, and if not why not? No one had addressed place as a location and only one participant included her ethnicity although seven of the eight participants could identify with Asian origins.

### 8.1.2. Week two

This session we visited the Fisher Bay Observatory (which overlooks the Bay area) with an aim of exploring connections with place. Participants were encouraged to explore exhibits that may ignite any interests, meanings, questions etc. about ‘place’ (left open for interpretation). After exploring the exhibits, with which the Explainers would have had familiarity, a discussion was held in pairs to encourage deeper thinking and understanding of the other person’s perspective and the development of their own thoughts in making place connections. The pairs in turn shared their discussion with the whole group on any connections, understandings, and awareness with place.

### 8.1.3. Week three to six

During these three weeks participants engaged in a process of creating art to explore and express their understanding of place. Options to 'create' were entirely up to the participants and their choices included painting, poetry, narrative, origami, collage. The atmosphere was designed to be playful, to foster creativity and engagement with place. Participants were given activities to encourage observance of their neighbourhoods such as capturing soundscapes and matching paint swatches from hardware stores to their surroundings (Fig.8.9).

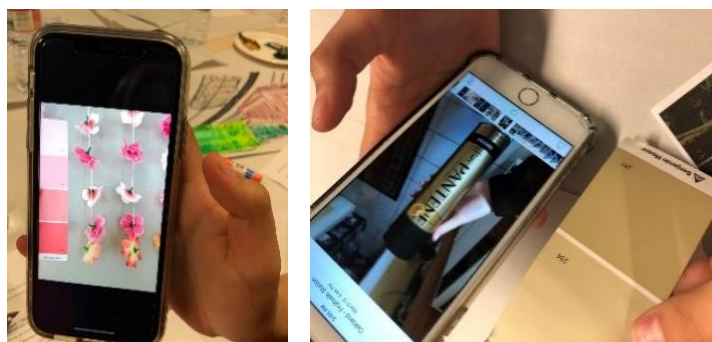


Figure 8-9 DC3 M3.7 Paint Swatch Activity

Each week at the end of the session each participant shared their process with the others, designed to encourage others and to share ideas. During the last session seven of the eight participants recorded a 30 second video (if they so wished) about what place meant to them for the public presentation. Ethical awareness was kept in mind throughout. I explained to the teenagers I would delete videos of my phone once transferred to video, that the link On YouTube would be unlisted and deleted promptly. The link to the final video was sent to relevant people in the Exploratorium with a request not to make it public, for two reasons, to respect the teenager's privacy and with regard to possible copyright infringements in images the young people may have used in their art pieces. During our last session a discussion was held on the overall process and a sense of place, and whether understandings of place had changed. This is discussed further in the analysis section of this chapter.

### 8.1.4. Week seven

This session entailed the public viewing of the final video in the Fisher Bay Observatory for a public audience (Fig. 8.10). Advertisements were placed around the museum and the Tannoy system reminded people in the Observatory they were welcome to join us in the public presentation. A table displaying participants work, associated narratives and transcriptions can be seen in Appendix BB.





Figure 8-10 DC3 M3.7 Public Presentation of Participants Works and Processes

## 8.2 Methodology

### 8.2.1. Data collection

The project gathered data in four different ways:

1. A weekly short open-ended questionnaire
2. Transcription of each audio recorded session
3. Thirty-second videos on participants art work, narratives and meanings (Appendix BB)
4. Post-project online survey, 55% completion rate (Appendix CC)
5. Researcher notes and observations

The questionnaire included questions on teenagers' engagement or connection with place (if any), development of new thinking, what they found challenging and any other comments. The survey questions asked similar questions, as well as young people's opinions on any changing awareness of place, the hardest and most surprising thing they found, and opinions on the playful learning aspect.

#### 8.2.1.1 Coding methods

Coding framework drew on thematic analysis methods (Braun & Clark), and Saldaña's first and second cycle coding approaches (2009, 2016). Other approaches such as FRAMES methodology (Campbell Galman 2013) ensured reliability and validity in the data analysis (Appendix L). Similar to previous design cycles I kept an analytic memo and code book (Appendix EE). Coding methods and types are detailed in chapter four (Methodology).

#### 1<sup>st</sup> cycle coding methods

All data was coded using elemental methods as well as drawing on affective and exploratory methods (Saldaña 2016)(Appendix DD). Transition methods such as described in DC1 were also carried out in this design cycle to focus on the direction of the research (Saldaña 2016). During this process I coded

all the seven weeks reflections in excel with the five different methods (*process*, *In Vivo*, *descriptive*, *values* and *holistic*). The initial codes from my five chosen ways of coding were colour-coded and reorganised into new category lists and from these condensed further into themes (Appendix FF). I wanted to make sure the coding was rigorous, therefore I experimented with one weekly session and brought it to full themes using all five coding types. After organisation of codes and categories comparing emerging themes I took the decision to go forward with analysing all other data with only one type, *process* coding. However I still kept in mind the other forms as in *In Vivo* and *values* codes and interwove these into the final narrative during the 2<sup>nd</sup> coding cycle. An example of reorganising initial units of analysis into categories using *process* coding method is in Appendix GG. Similar to previous interventions I created a visual concept map to aid the coding process (Fig.8.11).

### 2<sup>nd</sup> cycle coding methods

For the 2<sup>nd</sup> cycle methods data I chose pattern coding (Miles et al. 2014, Saldaña 2016) which is detailed in chapter four (Methodology). I found *codeweaving* (Saldaña 2016) was a helpful tool for writing a narrative, developing statements, generating assertions, propositions and developing 'bullet-points' of major patterns, trends, findings, themes in the data (Miles et al. 2014). Pattern coding develops the 'meta-code' (Miles et al. 2014, Saldaña 2016), a category label that 'identifies similarly coded data' (p. 235). Codes are grouped together into similar, smaller number of concepts, themes or categories, and can be captured in the form of metaphors (Saldaña 2016). Each pattern code included a written statement. These can look like a cause/explanation, relationships between people, a theme or a theoretical construct (Miles et al. 2014). Saldaña (2016) notes some pattern codes can 'hold merit' as major themes and the next stage of analysis began from the identification of these pattern codes and emerging themes.

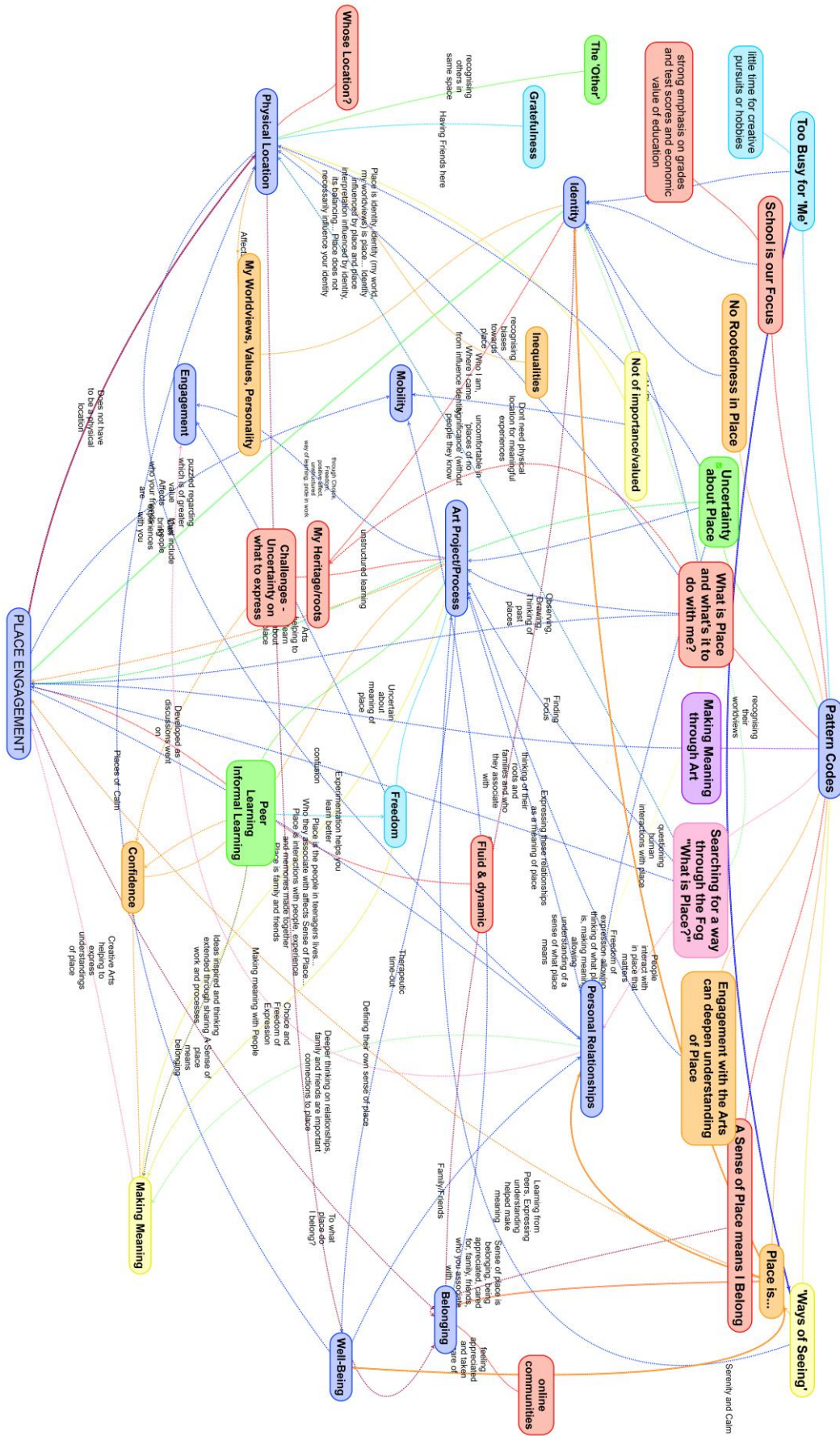


Figure 8-11 DC3 M3.7 Visual Concept Map - Pattern Codes

8.2.2. Data analysis

Miles et al. (2014) point to mapping out the pattern codes, laying out the codes that formed your pattern and seeing how the components interact. During the process of mapping pattern codes a pattern itself can be traced. In this example in Figure 8. 12 the development of a sense of place for the young people can be traced from the beginning of the project to the end (L-R).

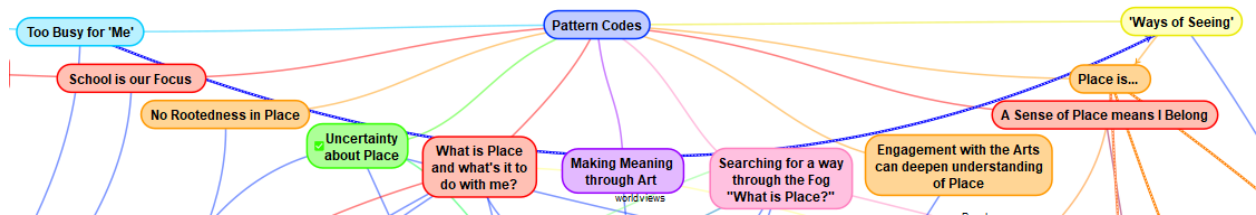


Figure 8-12 DC3 M3.7 Pattern Codes Chronological Order L-R

8.2.2.1 Pattern codes and statements

Following mapping the relationships between concepts and pattern codes, a list of 2<sup>nd</sup> cycle pattern codes and statements were listed in a table, an example of one pattern code is below (Table 8.1). The full table can be found in Appendix HH.

Table 8-1 DC3 M3.7 Pattern code example

Date	Pattern Code	Statement
2 <sup>nd</sup> March 2019	<p><b>Too busy for ‘Me’</b></p> <p><b>School is our focus</b></p> <p><b>No rootedness in place</b></p>	<p>Teenagers have a good sense of their own identities but have difficulties relating to place and do not have a rootedness in place. They have busy lives with a strong focus on school and not enough time for creative pursuits or hobbies. The pattern codes are <b>Too busy for ‘Me’</b>, <b>School is our focus</b>, <b>No rootedness in place</b></p>

8.2.2.2 FRAMES method of analysis

To ensure rigor in the analytic procedure, in the synthesis of the categories, and subsequent themes I adapted the structure of Campbell Galman’s (2013) FRAMES method which is outlined in chapter four (Methodology) and in Appendix L. Each letter in the acronym has a specific purpose in analysing data. For example, the F in the FRAMES framework is where the focal statement, theoretical sentence or assertion is made. If a theory is not developed from the data then a key assertion or a ‘summative and data-supported statement about the *particulars* of a research study’ will suffice (Erickson 1986 cited by Saldaña 2016). The FRAMES method proved very useful in bringing pattern codes to themes.

## 8.3 Findings

### 8.3.1 The development of 'place' understandings

The findings indicate that among the young people 'place' was associated with identity, people/relationships, location, belonging, wellbeing. Engagement with the arts aided understanding and helped make meaning. Throughout the seven weeks there was evidence of new thinking and a growing awareness of, and understanding on 'place'.

From week three young people are finding place connections with their identities and human relationships through engaging with the creative process of making their art pieces. During the making/creating/ art process there is evidence of enjoyment, excitement, empowerment all aspects of engagement. Although participants were given carte blanche to do whatever they wanted sometimes that can be difficult not knowing what to do or where to start. However their uncertainty turned to confidence in their projects, they made decisions, and knew how to proceed. From week three onwards they all had having concrete ideas of their work going forward. They valued their work and the freedom of expression facilitated in the project.

In the later weeks, young people displayed attitudes of focus, openness, imagination and confidence in themselves and their projects although still grasping with ongoing uncertainty on the meaning of place. There is positive feeling towards the use of the creative arts, learning from and being inspired by others, is as well as tension between familiar structured learning activities rather than unstructured ways of learning. Connections to place were made through making art. Sharing each other's ideas and processes encouraged and inspired the young people and opened up discussion and helped understand the concept of place. Place understandings became much clearer for the teenagers when they had the time to think, reflect, and were guided by their inner consciousness when making art. Putting something on the page all gave them a direction and steered them towards their final beliefs on the concept of place.

Many themes were common over the weekly sessions. Making meaning of 'place' involved *Identity* as a major theme from the beginning. *Location, People/Relationships*, were constant themes from the 2<sup>nd</sup> and 3<sup>rd</sup> week. Through the dialogic and art making process the themes of *Wellbeing* and *Belonging* emerged. These aspects were not mentioned at the beginning of the project but developed over the course of the project. A developing awareness and changing understandings of place can be noted from beginning to end of project (Fig. 8.13). Evidence of *Peer Learning* and *Engagement with the Arts* were the other two major themes that emanated from the data. Underlying all themes was *Uncertainty*, on the confusion of meaning of place, how to start expressing understandings through



art, and tensions between structure/scaffolding common to formal learning, and the blank canvas ‘no structure’ approach as in this informal learning project.

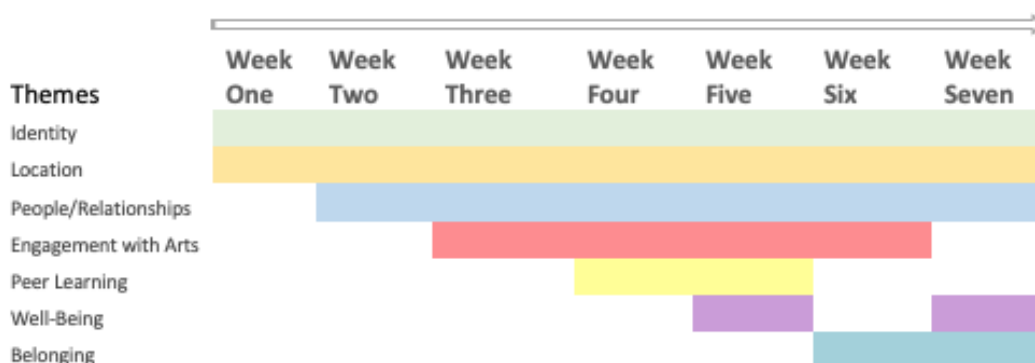


Figure 8-13 DC3 M3.7 Timeline of Themes Emerging from the Data

The ‘learningful play’ TEChE design model originating from the sixth intervention in DC2 was framed by five lenses of heritage engagement (materiality, digital augmentation, engagement, sociality, and playful learning). The lenses of heritage engagement are evident in different ways and varying degrees to previous cycles and these are detailed below.

### 8.3.2 Materiality

#### 8.3.2.1 Identity

At the beginning young people found it difficult to relate to physical place and identity although one young person reflected on the “*how your community shapes your sense of self*” – (week one). At the beginning, the self was evident in teenagers thinking on their interactions with place, “*thinking places I go*’ and ‘*my place in the world*’. In their sense making they found that the concepts of place and identity are intertwined, how place (location) influences their identity and their identity influences

- “*I gained awareness for how your sense of place affects how you view the world and your personality*”
- “*I started thinking about the place where my roots are from even though I’ve never been there*”
- “*I never thought about how my place is different for others. For example, even when walking through my neighbourhood I saw how there was a variety of people, all doing their own thing and being in the place for different reasons, interacting with different people, and making unique experiences*”
- “*one physical place can be so different to two different people ((pause)) in a way like ((pause)) that shows how identity changes how you interpret place but at the same time place is like a huge part of identity so it's like ((pause)) am (.) balancing*”

place. The teenagers began to think about their familial roots, their heritage, where they came from, how place influences their worldviews, and recognising diversity and the 'other':

### 8.3.2.2 Making connections- relationships with people

Teenagers began to make connections between place and identity. By week three one teenager felt *"more connected with my surroundings"*. Another reflected how thinking on her own neighbourhood made her more conscious of how *"place is important to who I am."* By week seven, a growing awareness of, and understanding about their sense of place was gaining clarity. To the teenagers place is more about people and human interactions than location. 'People' and relationships important to the teenagers included their friends and families:

- *"[Place is] dynamic and fluid, and that it is made of your interactions with people and the experiences and memories you make together"*
- *"I was opened more to how interactions shape place because the area that you're in is only an area but the interactions that you have with people do impact place"*
- *"What I was realizing was that while all of my connections had a place that created the relationship that place is not what I remember when thinking of them. Place seems incidental in what makes me feel at home"*

Evidence of deep reflective thinking in week two centered on inequalities, on the wealth gap in San Francisco, homelessness and LGBT pride. While trying to understand, define and connect to place, the discussion centered on place meaning different things to different people. This led one pair of teenagers to think about other people's perspectives giving rise to questioning inequalities they noticed in their city:

- *"Hearing from others and what they consider their place, I found interesting how we could be so different and yet all so similar as well" (week five).*
- *It is not particularly new but it was nice to think about how different a place is to different people – I think we often forget that there are so many sides and perspectives. Also it was great to be reminded of the wealth gap in San Francisco"*

By the last two weeks people and friendship are much valued in the meaning making on place. Place is people and relationships. Young people reflected deeply on the relationships between people and place and all clearly defined part or all of their understandings of place to relationships with other people:

- *“I feel like I never thought about how important my physical location is in all the friends I have”*
- *“My thoughts were pushed when I thought about how the people I hang out with change my place”*
- *“To me having a sense of place means feeling safe and welcomed with the people you love”*
- *“I recognise that a place is not just geographical but it has to do with how we interact in our surroundings, who is there and what kind of memories we have of the place”*
- *“Personally I associate place more with people than the actual location...if I’m in a familiar location but I’m not with anybody I know like I’d rather not be there. I’d rather be in a familiar place with people that I know”*

### 8.3.2.3 A sense of belonging

A sense of place means belonging (for one participant that is at an online community), a place where you feel appreciated and cared for. The concepts of place, belonging and identity are intertwined:

- *“For me place is a sense of place is belonging. So I didn’t grow up in San Francisco but I grew up relatively close and this is where my values and my personality and really how I perceive the world and that’s what place means to me a sense of belonging and who I am”*
- *“I feel like when someone says they have a sense of place that phrase it’s a sense of belonging and not necessarily ((pause)) simply tied to a physical location, like people can have a sense of place in online communities (.) and when people say that I feel like I have a sense of place that means I feel like I am appreciated and people care about me (.) that’s how I feel a lot of people think when they say they have a sense of place”*

One participant while acknowledging her ancestral line and ethnicity recognises this city is where she now belongs. Another participant believes that she belongs to many different places but chose her current location as the basis for her art work:

*“I had to filter through a lot of different places that I felt that I belonged to. Just to make it easy I defaulted to my physical place/neighbourhood” (week six)*



#### 8.3.2.4 Physical location

During discussions in week one, place was taken to mean physical location. Three young people stated they like to stay in their areas because that's where their friends are, they do not know anyone anywhere else and it is *"too much hassle"* to move outside. Another does not connect with their neighbourhood because there not much to do there and identifies with a different part of the Bay Area where his friends live. One participant said she goes to a lot of places for different reasons *"I feel like I'm never always at where I live"*. Although another participant is *"all over the place in the same place"*, in terms of school, living, work, friends, she does not identify with her physical place but to her personal characteristics and her ethnicity. Teenagers did think and reflect on their previous places, seeking a place they felt a connection to, developing new thinking on the impact of these places, noting how place affects who you are friends with (school, museum, and city of San Francisco) and feeling grateful for living in this place. Location is linked to personal relationships and means little unless people and relationships are included.

Young people are not rooted in their physical place. They stay and live in their place but have not developed a rootedness to their physical locations. Physical location is not important and as a portable concept place can be taken with you:

- *At first I was just kinda thinking of like what San Francisco is as a city (.) but a lot of that isn't necessarily important to me ((laughs)) just because I mean like even though I live in San Francisco ((pause)) I don't think it's ((pause)) I can have this same experience like somewhere else"*
- *"it doesn't really have to be a physical place, it could be things you identify with or just people around you so you can like bring place with you if you like.. in the people that you associate with yourself ((pause)) and different things... so place isn't like a set area but it's something you can bring along with you all your life"*

However, two other teenagers felt more connected to their physical place with one displaying evidence of her connection to location in her art work narrative *'A love letter to San Francisco'*:

- *"Through this project, I feel more connected to the city and realized how greatly my sense of "place" influenced who I am today"*
- *"I am very grateful that I have grown up in a place like San Francisco"*
- **A love letter to San Francisco**

*Thanks for always being there for me when I needed you. The hills the fog and night rider on BART forever comforting me. All the days and nights exploring the crevices and cracks. I fall more in love with the city by the bay, cultures mixing in with each other, a warm embrace of the world right at my doorstep. What would I do without you. I love you San Francisco"*

### 8.3.2.5 Wellbeing

Wellbeing emerged as a theme during place meaning-making through art. One participant spoke of being overwhelmed and although not officially part of the project, the backchat has been on education and pressure of grades and college acceptances.

Another participant's ideal future place would be a *place of calm and serenity* (which in turn enhances wellbeing):

*"As much as I enjoy living in the Bay area, the fast-paced lifestyle that comes along with the area can be overwhelming at times. The cranes [origami] show that in the future, I would like my place to be somewhere that is serene and calm"*

One participant's work are places where she finds calm, e.g. her drawing includes a fish pond, a house/home and a graveyard (which I interpreted as possible family members that may have died):

*"I just thought of things like that calm me down"*

Wellbeing is also related to being happy and content and there was evidence from two participants on the benefits of time-out and creating art:

- *"I just liked having time to express place in different ways"*
- *"It was really therapeutic to spend an hour every week just reflecting and creating art"*

### 8.3.2.6 Uncertainty

The uncertainty about exactly what place is remained throughout the project until week six when the participants verbally articulated their understandings through explaining their art pieces:

- *"I'm still not sure what the project will be like – I don't know what the final finished product should be about"*
- *I still am not completely sure if I solely think of my place as my relationships, or whether the physical places in which I live holds weight*
- *"I had a hard time translating the place ... so I focused on all the people that make my place that I'm in so I decided to write all the people that are important to me"*
- *"Sometimes I wonder what "place" means to someone, what makes somewhere meaningful to someone"*

### 8.3.3 Digital augmentation

As computer technology was not part of the design in this cycle (DC3), and the context was different in many aspects to previous interventions, the same engagement with learningful play as the previous two cycles was not applicable to this learning context. However, the teenagers did use their mobile phones for research purposes, taking and searching for collage images which they then emailed to me for printing. Another small technological activity carried out by the teenagers involved the use of their cell phones to match hardware store paint cards with objects/items from their neighbourhoods (Fig. 8.9). The exercise aimed to increase observation in and awareness of their lived places.

When asked in the online post-survey their opinions on if we had used technology would their experience have been different the replies were mixed. One participant said technology is ubiquitous and therefore boring and art is more interactive and fun. To others, technology would have made a difference in that the physical creation of the final piece would have been different (N=3), with an opportunity to edit and be more well put together (N=1). However, another participant disagreed saying 90% of the process *'happened in my mind'* and only *'the execution and physical creation of the piece would differ'*.

### 8.3.4 Engagement

As defined by teenagers, place is people, relationships, identity, belonging, physical location and wellbeing (Fig. 8.14). Engagement with art helped develop this sense making on the abstract concept of place.

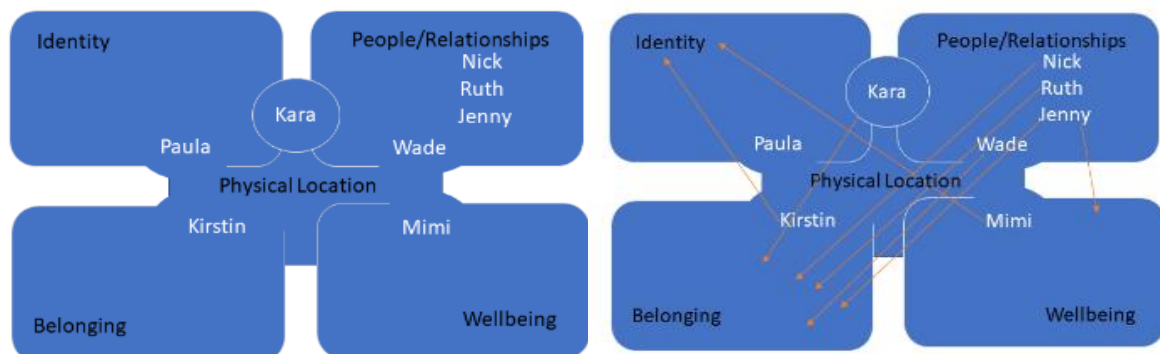


Figure 8-14 DC3 M3.7 What Place Means to Young People – L-Meanings of Young People’s Final Art Pieces, R- Meanings of Young People’s Final Art Pieces Added to Other Forms of Data

While making meaning about ‘place’ there were positives and the negatives on the art project process, Young people found it hard to start with a blank page to think about and project what place meant to them. There were challenges of remembering (what is in your neighbourhood) when first

trying to draw something. Positive beliefs included the benefits of visual arts for making meaning with place and the freedom of expression to gain understanding.

Three young people believed they were engaging with place through drawing and writing. One young person felt an emotional connection to the places in her photo collage and her writing piece 'love letter to San Francisco' demonstrated her passion for and inspiration she derives from her city. Young people believed in and appreciated free choice. They believed in themselves and were satisfied with their project progress although there were aspects that caused apprehension like not knowing what to do but there was also satisfaction once they got ideas and knew how to progress. Apprehension over the blank page syndrome seemed to dissipate as they progressed and became confident in their own ability to do something while feeling uncertainty:

- *"Working with visual arts was a great way to show our understanding of place and what it means to us. I'm excited to create a poem, and more visual arts"*
- *"Everything pretty much worked, just had some trouble thinking up things on the spot"*
- *"I enjoyed exploring place in this way because it allowed me to express myself in a way that isn't the typical essay format"*

Through the meaning making on place process mediated by art, being time-poor, anxiety in the formal schooling system and getting into college formed the back conversation while the teenagers were making their art pieces. This is reflected in the piece of one participant whose work changed as she engaged in a dialogic process:

*I didn't originally plan on coloring in the MUNI\* gold, but after rethinking, I decided it would be a good idea. It represents how we can/have the ability to move from place to place not only can we physically leave our neighborhood but we can also leave our place in (unreadable). Because I take the Muni\* to school, the gold represents how gaining an education can help people leave/change their social economic status*

\*public bus service

From the post-project survey it was found all (N=5) enjoyed exploring place in this way (through discussion and making art) with one participant commenting the positivity of viewing place as an open-ended topic and open to one's own interpretation on how place has affected his/her lives and personalities. Another participant's art piece made him realise the importance of what is around him and past places that have affected his self.

### 8.3.5 Sociality

The playful nature of the project and its perceived lack of structure for the young people inspired creativity and opportunities to learn from peers. Sharing each other's ideas and processes was an important part of the engagement and creative learning process, it helped them reflect on their own work and progress and was important for getting ideas. Sharing encouraged others and opened up discussion leading to new understandings on the concept of place:

- *"I got inspired by seeing other people projects and I have new ideas on how to improve my work"*
- *"I'm pretty happy with my idea"*
- *"The people around me gave me some ideas on what I wanna do"*
- *"Seeing other peoples final projects helped me see the different ways people define and interpret place"*

One participant did not mind sharing but was aware of how peers could laugh at her (which they didn't as everyone was very respectful). From the post-project survey it was found that two young people had no issues with sharing their final pieces and thoughts with the general public in the museum, and one teenager was particularly proud of her final outcome. However two participants were uncomfortable because the setting was 'less intimate and secure', the other having ethical concerns because her piece included images of family and friends. Overall young people were content, confident and happy with their art progress, one participant feeling proud as she additionally performed her written piece in her school. Peers helped each other make sense of place and move forward in the process of making meaningful connections to place through making art.

One participant noted that freedom of experimentation and expression helped her learn much better:

*"I just think when you learn in a way like this when your allowed to just express how you feel whether it's through drawing or making collages its helps you learn a lot better because you're enjoying what your doing and it's more likely to stick with you, it gives you a chance to experiment what you like and what you don't like"*

Participants believed they developed creative skills, thinking outside the box, creating work based on their own thoughts and feelings, adding their own touch and feeling proud, readjusting their work throughout the process were all aspects that made the experience enjoyable. Autonomy was valued allowing young people find their own direction:

*"I appreciate how we were not forced in one direction or another; we were allowed to find the value of place on our own without an imposition"*

### 8.3.6 Playful learning

The playful nature of the project, the fun and interactivity with others added to their overall project positivity as did the open-endedness of the topic and freedom of interpretation. Young people appreciated the freedom (although also apprehensive) to *'dive in and dissect the meaning of place'*. All respondents to the post-project survey (N=5) were satisfied with the playful learning aspect of the project, play to them meant enjoying what you are doing, interacting with others and having fun. One young person mentioned how the playful aspect of not having strict instructions (as in school) is a rarity for her allowing her to have the freedom to make meaning in her own way.

There was tension between structured and the unstructuredness of the project. Young people are used to *'structure overload'* in school and although finding unstructuredness challenging, time-out, choice, freedom in expression and having the time to connect with place were valued by young people:

- *"I felt unsure on what to do just because I'm used to getting specify instructions on what to do (like in school)" (online survey)*
- *It was great how we were able to do our own thing with our project and we were able to freely think about it*
- *"I enjoyed spending time out of my day to just draw and bond with my fellow explainers" (online survey)*

One participant connected more with the way he was engaging with the subject matter 'place' in an playful informal, self-directed manner rather than through formal education:

*"I think is easier to come to a more natural conclusion, because if someone's saying something to you, you don't really have enough time to think about it and if that's really true or not ((pause)) and especially if it's in a very innovative rapid setting and if like someone saying this piece of information this piece of information you don't really have time ((pause)) to think whether or not it applies to you ((pause)) because you might like be nodding your head or something but you don't really like connect with it"*

## 8.4 Discussion

### 8.4.1 Poetry analysis

Poetry can capture deeper meaning to participant's words and dialogue, while revealing the essence of experience rather than the researcher's narrative as noted in the methodology chapter. This verbatim data poem, from our discussion in week one on place, captures how teenagers view their lives. It gives a sense of busyness, moving around, and their worries but shows the human values such as empathy, kindness and self-awareness of these teenagers.

#### **I Am...**

a daughter,  
sister,  
student,  
artist/musician  
and foodie

self-aware  
I care a lot  
put others first,  
tired  
because of all the things I do

curious,  
spontaneous,  
I keep my grades up  
but at the same time  
I like going out,  
like having fun

I do really value school a lot  
its important  
being financially responsible,  
like it can ruin your life  
not to be

financially responsible

I'm always like very worried  
like about things,  
a sense of anxiety,  
I feel pessimistic just like  
what school has done to me

life happens..like even through times  
that are tough and dark  
I still manage to keep  
everything  
in my life  
intact

I don't really connect  
well with my neighbourhood,  
I go all over the Bay area,  
I'm never always at  
where I live,  
I'm all over the place  
but I'm still in like  
the same place

### 8.4.2 A sense of place

Exploring a sense of place from the confines of a city museum was a challenge from the outset. As the literature suggests a sense of place is a difficult concept to define and measure and as a place is a philosophical concept as much as a geographical one, this led to difficulty in grasping concepts for the teenagers. However, a dialogic approach, which is fairly new to informal environments (Ash 2009), developed place consciousness for the teenagers. Uncertainty led to clarity.

#### *Location*

The findings indicate an overall lack of interest in one's physical place. At the beginning of the project no one identified with their physical place, although young people mentioned where they lived and visited yet there was little concrete connection with location. Research has noted a dis-connect with place (Basso 1996, Gruenewald, D. A. and Smith, G.A. 2008, Newman 2009, Smith and Sobel 2010a). Many young people move around for college and work so are being constantly uprooted, nor do they live long enough in one place to 'develop intimate relationships with it' (Gruenewald, D. A. and Smith, G.A. 2008). Orr's (2013) perspective is people are either residents (no interest, displaced, always going somewhere) or inhabitants (caring deeply, have knowledge, observe and are rooted) of place. This 'placelessness', not developing connections to place leads to alienation from others and lack of participation in community life, both social and political (Gruenewald, D. A. and Smith, G.A. 2008). Most of the young people in this research cycle could be termed residents, little or no interest in their place, on the move to different areas to school, work, visiting family and friends etc. They reside in their place but do not 'know' it, a neighbourhood becomes to one participant challenging to remember when making art. They have their own communities which are not place related, and as is evident in the above poem they appear to be "*all over the place in the one place*" yet not noticing that place. Smith and Sobel (2010b) found American children are community-deprived and are disconnected with their place (Smith, G. and Sobel, D. 2010) and the latter was the case in earlier sessions with the young people.

Sense of place is being disrupted for people globally (Colomer 2017, Menin 2003). There are many reasons for this disruption as noted in the literature review, with some of the teenagers showing evidence for this disruption. One girl blames technology and her busy life as the reasons she pays little attention or interacts with place. Another teenager feels a sense of place through online communities and is not interested in his physical place. This dis-locatedness (Newman 2009) from the local, lack of rootedness with little or no engagement with physical location is causing problems for youth's futures lives, in the care of their physical lived places (Orr 2013, Smith G. and Sobel, D. 2010). The evidence points in this intervention to agreement with the literature findings and to Orr's 'cult of homelessness', which he believes is the destruction of communities resulting in a deterioration of social and ecological



issues. Whereas the literature suggests concerns regarding lack of care and how this affects future sustainability, in an era of climate change it is important for education to foster caring conditions for civic participation and environmental stewardship (Smith & Sobel 2010).

### *Social personal relationships*

Cresswell's (2015) understanding of place is 'location plus meaning plus power'; what people do in a place is as important as the physical materiality of a place (2015). The findings show how young people's focus is on their identities, themselves and their human relationships rather than physical location of place. Although as environmentalists, Smith, Sobel and Orr stress the importance of the tangible interaction with place, the meanings people attribute to place are equally important. There are other understandings about what 'place' means and these are not tied to a physical location. Many authors (Cresswell 2015, Gruenewald, D. A. and Smith, G.A. 2008) have commented on the complexity of place which the young people struggled with throughout the project. No one, Cresswell states knows what they are talking about when they talk about place (2015). It can be a mosaic of everything (Orr 2013) and a way of 'seeing, knowing, and understanding the world" (Cresswell 2015, p. 18). The literature has shown the value of belonging and how social networks and relationships holds society together (Smith 2006). To the one participant who developed a relationship with her physical city over the course of the project, her a sense of place indicated a sense of belonging to the city and with her family and friends. However another teenager had a '*fairly pessimistic view of place*' but remained open to reflecting on place. Similar to findings by Derr (2002), family, social relations and personal meaning are more important in developing relations with place than the physical features of spaces. Place-making has been linked to increased levels of wellbeing (The Heritage Council 2016), belongingness and community and this is evident in some of the teenager's engagement with place.

### *Portability of place*

To one teenager place is portable, place to him does not have to be a physical location or set area, *place is things you identify with and people you associate with therefore place can be brought with you*. Another young person stated he could have the same life experience somewhere else. If place is a space given meaning by human interaction, Malpas (2008) suggests that this space (now a place) can be separated from meaning and the meaning can be transferred elsewhere as with Virtual Reality (VR). This is good for the VR industry and can potentially help people cope with the loss of their physical heritage, their place, through war, displacement, climate change etc. but for the average person in an average location, if they have no connection with their locale, where they live, they will not care for it, they will not engage in civic engagement, care conserve or preserve ecosystems or take

action on behalf of their physical place (Smith and Sobel 2010a). The challenge is to foster meaning making with place, albeit in small ways, but an awakening to awareness nevertheless.

The findings show dominant meaning of place is people and indicate the importance of the social aspect for the teenagers. Young people's focus is on their identities, themselves and their human relationships. Whereas the teenager mentioned earlier who developed a passion for and emotional attachment to her city (the depth of which surprised her), her relationships with other people were also important in understanding place. Cresswell (2015) has noted that people are integral to place understandings, ways of seeing and knowing can be social understandings rather than a physical location understanding which is mostly thought of when we discuss place. Cresswell (2015) explains by this way of seeing we see worlds of meaning and experience. Community is equally important for teenager's future lives. Young people are making connections, creating shared understandings and laying down bonds with each other (Walsh 1992). This is important for community building, which declines when there is no rootedness in place (Orr 2013).

### *Globalisation*

Equally globalisation has an effect on young people's engagement with place. Globalisation produces "homogenised global spaces and erodes cultures" (Cresswell 2015 p. 14). Many people are recognising economic globalisation, displacing of local businesses, and the destroying of local communities. Inequalities and the wealth gap came up in weekly sessions and one person 'noticed' how many closed businesses there were in her area when doing the paint swatch activities. The evidence points to young people believing one can have the same life experiences in any place, not all have recognised difference or what Gruenewald & Smith (2008) refer to as the diversity in places and between places as yet in their lives. However during the course of the project teenagers began to notice and gain awareness of the 'other' and their communities.

### *Place-consciousness development*

Gruenewald & Smith's (2008) term of place-consciousness learning rather than place-based learning fits well in the context of this design cycle. Young people did become conscious of others and of small changes within their area in their development of a deeper awareness on place. One of the aims of place-based education is to lay a foundation for young people's civic engagement which is essential for a democratic society and the public good (Gruenewald, D. A. and Smith, G.A. 2008, Smith and Sobel 2010b). The literature points to American youth as growing up indoors (Smith and Sobel 2010a), and to having a nature deficit disorder (Louv 2008) which indicates a lack of interaction with physical place. People tend to care for what they know (Smith and Sobel 2010a); one young person in this study found it challenging to remember what was in his neighbourhood. These are all reasons why

place-based education and learning is important to engage young people with place. Humans ourselves as a species are also facing challenges some of which the young people articulated such as homelessness, wealth gap and challenges for LGBT youth. Learning how to sustain communities, work together, recognising diversity in place and between places, recognising interdependency, their co-dependence on those around them, ethical considerations, critical thinking on what fosters wholeness and harm are all part and parcel of what young people learn through place-conscious education (Gruenewald, D. A. and Smith, G.A. 2008).

As a result of discussions and participants involvement in the creation of their art pieces thinking on place was extended. All in the online survey (N=4) stated that their awareness of place changed by the end of the project. They had to '*use their head to think*' about places, and through the discussion realised how their place had influenced their '*personal opinions and outlook of the world*'. When selecting one thing that engaged them with making meaning on place, one participant referenced a movie theatre which was the starting point of her collage on friends and family, one mentioned revisiting places he hadn't been to in a while, another referenced being and observing in the city, whereas another enjoyed the paint swatch card exercise (trying to match similar colours on the hardware store paint swatch to colours in their own neighbourhood). Being outside in place, visiting, observing and doing the activities engaged them with their physical place. It is challenging to run PBE programmes in a museum when the literature suggests being outside and in place are where engagement with physical place happens. However, the literature points to museums being in a position to mediate a sense of place and to their potential role of making connections between people and place (Walsh 1992). As it is many museums are already involved in many excellent educational and community outreach programs. However with little literature on place-based education within museums (Kalessopoulou 2019) this model serves as step in a direction towards developing place-based learning programmes in museums.

### *8.4.3 Playful engagement through the arts*

Art was the method employed to engage young people with place. Graham refers to art as its own language, opening up conversations about experience, inquiry about the world, how we view the world and our relationship to it (2008). During the '*making/creating/ art process* there is evidence of this sense-making about ourselves and our world. There is also evidence for enjoyment, excitement, and empowerment. These along with evidence of autonomy, challenge, pride are all aspects of engagement (Mardell et al. 2016). Although participants were given carte blanche to do whatever they wanted sometimes, the '*blank page*' can be challenging, not knowing what to do or where to start. However their uncertainty turned to confidence in their projects, they made decisions, and knew how to proceed. They valued their work and the freedom of expression facilitated in the project and

made “*meaningful art pieces that we could all relate to*” (teenage participant, 2019). Over the course of the project they found meaning through art expression. Research has shown how for some people art can help people think beyond the verbal way of thinking (Bagnoli 2009), some elements of a learning experience may be inexpressible through words (Gauntlett 2007). Dewey has stated art gives meaning to experience “Science states meanings; art expresses them” (Dewey 1934, p. 84). The process of art is the means by which deeper levels of life emerge as thoughts and desires: art’s function is to “break through the crust of conventionalized and routine consciousness” (Dewey 1946, p. 183). Papert has alluded how constructing or making something tangible brings out a child’s inner feelings and ideas (Papert and Harel 1991) and how this active connectedness with whatever is under study is a powerful way of understanding and learning (Ackermann 2004). Each young person’s finished art piece accessed the unconscious, revealed their meanings and their sense of place (Appendix BB).

Contrary to structured high-school learning there was no structure or fixed instructions. Although confusion was evident at first for most participants, one young person believed that the gradual open-endedness of the project allowed her be more creative. Another believed it was good to make him/her think, another felt unsure because she is used to ‘*getting specific instructions on what to do (like in school)*’ and another felt mixed feelings, she enjoyed the freedom but also felt intimidated by the blank page. The blank page ensured freedom for teenagers to experiment although this was a risk as sometimes too much freedom or choice can be paralyzing. However, the teenagers found their own way through the process, fostering their own creativity through support from peers and my support as a facilitator. It is not new that the skills young people need for their future lives including dealing with uncertainty and learning through non-traditional teaching methods are not being fully supported in schools. In an era of ‘highly bureaucratized and standardized educational systems’ (Gruenewald, D. A. and Smith, G.A. 2008, p. 4) and where rote learning is rewarded by grades, Graham (2008) states that within education something else is needed. The aesthetic experience (art) provides the ground for questioning which in turn launches sense making and an understanding of what we exist for Graham (2008). Throughout the project young people questioned as they progressed with making their art pieces. In turn they made sense of what place meant to them and an understanding and awareness grew out of this art process. This awareness of place is an important outcome, awareness especially needed for what Gruenewald & Smith call the “the social and environmental degradation of place” (2008). Having alternative forms of engagement with subject matter such as place affords young people an opportunity to engage with the subject. One student commented on his enjoyment of exploring place in this way “*because it allowed me to express myself in a way that isn't the typical essay format*”. Research shows how valuable the arts are in education,

they “elicit many cognitive benefits to students and therefore should be integrated (back) into learning” (Perignat and Katz-Buonincontro 2019).

With discussion and weekly sharing of ideas, thoughts and working processes the teenagers found that sharing with others as they went along helped them reflect on their own work and progress, clarified thoughts, helped form their own ideas and come to their own understanding and interpretation of place. Resnick’s ‘Spiral of Creative learning’ process (Resnick 2007a), employed in this research is one such theoretical framework for coming to understandings through a creative arts process. The arts helped with teenager’s sense making as confidence in their ideas and projects grew in all young people over the duration of the project. Similar to the Danish dialogic- process museum project highlighted in the literature review (Dindler et al. 2010) the dialectic relationship, the learning relationship with place is embedded in the children’s final art works.

Playfulness was embedded in the learning environment from the beginning fitting in with the playfulness ethos of the Exploratorium museum. The informal learning atmosphere through dialogue and the arts is one which the teenagers found different. At the beginning one participant was not familiar with making art and was unsure what to do, by the end he displayed great pride with his completed art piece (Fig 8.15). Within this playful space they found time to experiment, make mistakes, and try out ideas in a positive non-judgmental atmosphere. The literature has shown how a playful environment fosters creativity, how they go hand in hand. Teenagers enjoyed the time to ‘be’ and develop their creativity. The playful and creative environment fostered their wellbeing. Teenagers enjoyed this time together, to bond and connect with each other.

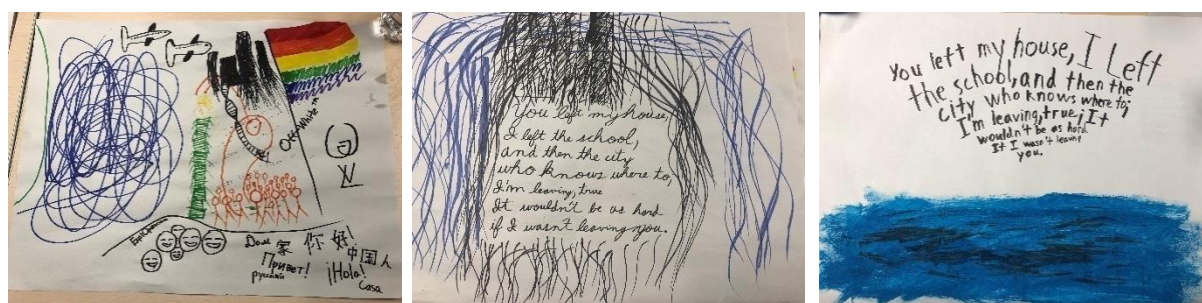


Figure 8-15 DC3 M3.7 Process of a Participant’s Blank Page to a Finished Art Piece

#### 8.4.4 Formal and informal learning tensions

The findings suggest there are anxieties regarding the educational focus of young people. One of the patterns in the coding process ‘School is the Focus’, found school as a major cause of young people’s anxiety levels. Although education is valued and teenagers believe education is good to change social and economic status, in week one four young people expressed their concerns. Another participant was happy with her school (which happened to be a School for the Arts) stating how her schooling

influences her creativity and how creative writing helps her adapt to many situations and subjects. Others found the opposite. Not having the chance to express themselves creatively, the focus on grades, no time for sport or hobbies as they are studying in downtime/spare time, the pressure to succeed for financial reasons, and feeling pessimistic because of “*what school has done to me*” all show the pressures teenagers are under today in terms of what it means to be educated and what it means to succeed. One person found it important that school is a priority “*I value school a lot*” as it has ‘*financial implications*’ and a person must be ‘*financially responsible*’. Another found that with ‘*structure overload*’ she has to work at not being overwhelmed. Grades have to be ‘*kept up*’, focus must be on school (no time for creative pursuits), and spare time (e.g. having a hobby) is wasted time if not studying or resting. One person stated that they don’t have the chance to express themselves creatively in the context of school pressures. Literature has found that formal schooling has increased children’s anxieties and whereas this is outside the scope of this thesis it is important when working with young people to be aware of what matters to them. Gray (2014) has written extensively on schooling in the United States, society he states has led people to believe in the importance of school, testing and grades rather than self-directed activities especially play. According to Gray (2018) it’s no secret that young people today are stressed and cites a 2014 poll by the American Psychological Association that 83% of young people ascribe their stress to school. Gray (2013a) calls school a prison, stating many have become burned out by the schooling process and how it is causing severe psychological damage to many students. Gray (2010) found that being well off financially is more important to college students than developing a meaningful philosophy of life, which he adds is a reversal of the perspectives of young people in the 1960s and 1970s. Additionally, capitalism has been strongly associated with the U.S. educational system. Gruenewald, D. A. and Smith, G.A. (2008) believe schooling exists to promote nationalism and to provide a willing and skilled work force for the market economy. Evidence of this can be seen in the teenager’s discussions on test scores, grades, college courses etc. and evidence displayed related anxieties. The art piece of one participant who painted her local mode of transport, a MUNI bus, travelling through her neighbourhood gold was her representation of the value of education in changing her economic and social status. The evidence points to young people having little or no time for creative pursuits or just ‘being’ in place. ‘*Keeping up grades*’ to secure your financial future does not allow for such activities.

The informal playful learning nature of this project ran opposite to the usual structure of formal learning. Sharing ideas and learning from others was valued and young people believed it helped in making sense of place. The teenager who represented the value of education mentioned twice how she wished she had tried different mediums in her art project (possibly after seeing and hearing others work and ideas when sharing) and not stuck to what she normally does. Not being able

to take a risk in trying something out coupled with her unconscious choice of gold colour to express the importance of education for future success links to her experiences in the standardised global formal educational model.

#### *8.4.5 Value of place-based consciousness and education*

As far back as the early 20th century John Dewey spoke of the importance of incorporating children's experiences of their communities and places into formal schooling (Dewey 1897, Gruenewald, D. A. and Smith, G.A. 2008). However still today PBE (an approach to teaching and learning that connects with the local (Smith and Sobel 2010b) is not on the school curriculum although many teachers involve their students with local learning (Gruenewald, D. A. and Smith, G.A. 2008).

People are becoming aware about reclaiming the local, of the need to do something, to take responsibility and mediate the impacts of globalisation on their local cultures and ecosystems (Gruenewald, D. A. and Smith, G.A. 2008). However the authors say there is little written on the role of education on this process. This project, as a small step on to the road of awareness for young people in an urban setting can help fill this gap. If one wants to educate people to mediate and to take action on their place they must care, and to reach that point they must develop awareness of their place. Supporting the local, developing a rootedness or an attachment to your physical place, even if in a small way is creating a connection. Even small ways of engaging with place are laying the foundations for future civic engagement. We must learn how to re-inhabit our place in order to meet future economic, social and environmental challenges in the 21<sup>st</sup> century (Orr 2013).

One of the way forwards for PBE is through museums and heritage centres. Whereas young people may not want to attach to their place or lay down roots for various reasons, unless there are programmes in large urban cities as in this context teenagers may never get a chance to actually stop and think about the place and the people where they live. For museums who don't have to deal with what Gruenewald, D. A. and Smith, G.A. (2008) calls the 'centralization bureaucratized and standardisation educational systems', they are in a perfect position to introduce place-based learning/education and develop awareness of place, ideally in place. However if that is not feasible, a hybrid approach, a museum outreach programme into the community would be an ideal scenario. I say the above on the strength of a question I asked the young people at the end of the project. *Can you name **one thing** that engaged you (even in a small way) with your place?* Being outside in place, visiting, observing and doing the activities engaged them with their physical place. One person referenced a movie theatre which was the starting point of her collage on friends and family, one mentioned revisiting places he hadn't been to in a while, another referenced being in, and observing the city, whereas another enjoyed the paint swatch card exercise (Fig. 8.9). Being in place matters when trying to engage with place but that is not always possible. Within the constraints of being inside

a museum as this research design shows, making connections to place is possible. Because of the nature of PBE it is different context everywhere, it cannot as Gruenewald & Smith point out “be packaged and then disseminated” (2008 p.4). It depends on the interactions between the learners and the actual place itself. I like to use Gruenewald’s term ‘place-conscious learning’ rather than place-based learning or place-based education. Within that frame of ‘place-(un)conscious learning’ consciousness and unconsciousness (making meaning through art) a museum programme can develop understandings and awareness of place for young people.

### 8.5 Chapter Summary

Design Cycle three took place in the international setting of the Exploratorium Museum in San Francisco, U.S.A. Eight teenagers volunteered to participate in the third design cycle of this thesis. This cycle served as an opportunity to transfer the existing *TEChE* design model to a significantly different learning context. Various contextual constraints and challenges meant readjustment of the design model. Over the course of seven weeks the young people explored the meaning of what place meant to them through making and creating art within the confines of the museum. Art proved to be a valuable tool in sense-making. By the final week identity, people/relationships, location, wellbeing and belonging were evident as the main understandings of what place means to the young people. The findings indicate there is little rootedness to physical location but connections and attachments to people and relationships are very important as well as belonging, wellbeing and recognising ‘who I am’. To develop awareness and connection to place, in order to foster civic mindedness and for the good of all communities, museums and heritage centres can play a vital role in conducting educational place-conscious programmes.



## Chapter 9 Sense of Place Design Model

### 9.1 TEChE Model Adaptation

#### *Introduction*

Within this thesis, the *TEChE* design model (Fig. 7.2), as outlined in chapter seven evolved over six interventions. Each iteration was implemented and evaluated in naturalistic settings. The seventh iteration tested the model in an international setting, in a world-renowned museum, The Exploratorium in San Francisco, U.S.A., known for its focus on inquiry and playful learning. The model adapted to the ethos of the museum, which was important when discussing project possibilities with the museum staff. The *TEChE* model was adapted to suit the context and refined as needs dictated and the project progressed.

There were challenges when adapting the *TEChE* model to an international setting. The data collected had significant differences. Differences such as age and developmental stages of young people, smaller participant numbers, diverse ethnicities, locations and cultural dispositions. Therefore the DC3 intervention cannot be compared to the previous design cycles, neither are the original model design sensitivities comparable with the U.S.A. project's set of learning sensitivities. The process of adapting the model is outlined below, detailing how it transferred to the new learning context, and the challenges and opportunities that arose in relation to the overall aim of this thesis which is to explore an optimal design for heritage engagement with young people. Design sensitivities outlining the changes, and specifically suited to this learning context are detailed in Table 9.1.

#### *Methodology and Design-based Research*

The methodological tools and methods remained faithful to the previous design cycles including the coding processes, questionnaires, surveys and visual data. However, with the small sample size (N=8) extra analytic methods were included such as the ethnographic FRAMES framework, to ensure rigor and validity. The DC3 dialogic approach with a small number of teenagers provided opportunities for more open conversation, with each other and with me, as opposed to previous interventions with younger children in Ireland.

DBR is useful for complex educational innovations where 'little is fixed' (Hoadley 2005, p. 46). The methodology was particularly suitable going into DC3 as little was known until I was on the ground in the Exploratorium Museum. Details of adapting the model could not be worked out until I was actually in-situ myself. In terms of ethical responsibility to the host institution and to the participants, before the project began with the teenagers, conversations took place with the relevant museum staff to ensure the project was feasible. Although there was a small sample size of participants, there was

an opportunity to see how engagement with place could happen from within the confines of a city museum and not out in place as many PBL projects are set. I made sure staff were informed of any relevant decisions I took in the design of the project. Equally their advice on how to progress the design was helpful and encouraging.

With any design model the aim is to for it to be transferable to other local settings and for it to have local impact in a new setting (Barab 2006). Should anyone set out to adapt any model, there are certain aspects of the existing design model that need to be in place. It is vital that there was rich description in the *TEChE* model and that design process insights were shared. Methodologies and rich descriptive accounts, clear findings are all vital for others to understand as each new adaptation is to a new context with its own dynamics and differences. Important too in educational design research is explaining the messiness of authentic learning settings to add value to theoretical claims arising out of these real-world settings (Barab 2006). Even with this in place there was no guarantee the model would be suitable in a significantly different setting. One advantage of DBR is its flexibility and procedures do not have to remain fixed (Barab 2006). Therefore, I could tweak the design as applicable to the theoretical aspects of the new learning environment, and deliver insights into why and how the intervention worked (Barab 2006).

### *Transferring the model – Constraints and Challenges*

As the design evolved over the seven weeks changes arose on the strength of the previous week's session. Design changes had to be made quickly to suit the context of the new learning environment and take into account the constraints regarding participants, time, methodological tools, teenagers working schedules, etc.

An initial challenge in the transfer of the model required a rethinking on the phenomenon under study and the ways in approaching understandings (of place). Within the new context there was a shift in participant's ages, and cultural differences from the children in Ireland. U.S. teenagers were more open and confident so a move to a more dialogic approach was more suited to working with the Explainers. This change in dynamics was a challenge as the *TEChE* model was very invested in physical location as a notion of 'place' and place-making, in the initial two design cycles heritage and place are very much part of the cultural landscape. In San Francisco, the understandings were different. The project did not lend itself to being outside in 'place' therefore place tended to be discussed philosophically rather than geographical understandings in the initial two cycles. Therefore, there was a shift in the study to 'place-make', to work out and develop shared understandings about place, and to make connections with each other. This I believed could be addressed through a dialogic approach. Awareness of place, what it is, and what value it may be (if any) needed to be addressed before understandings could be reached on the importance (or not) of place.

Another design change from the *TECHe* model was in the use of technology. There were time constraints with the teenagers. As they are paid by the museum to explain interactive exhibits to the public, I only had one hour with them each Saturday. Because of their strict timetabled working shifts I could not afford the time that could potentially be wasted in dealing with technological issues. Additionally the iPads that were available to me had certain restrictions, and not having control of them as I had in previous cycles added to my concerns using technology. However, the design included small interactions with teenagers own cell phones through project activities and for communication purposes. Therefore I adapted the technology (computers) to technology (pen, pencil and paper). The model had evolved into a dialogic approach to heritage using the creative arts as a means of engagement.

### *Transferring the model – what worked*

Many of the issues and challenges transferring a model are local to the context. For example the Exploratorium could be considered a STEAM museum, although it does not use the term specifically. Art and creativity are equally as important as STEM (science, technology, engineering and mathematics) in its interactive exhibits, and to its playful learning ethos since the founding of the museum in 1969. The playful creative ethos of the *TECHe* design model was ideally suited to the learning ethos of this museum. Not every educator is comfortable with integrating artistic practices into their practice (Perignat and Katz-Buonincontro 2019). However, I was able to do so comfortably and this personal characteristic was helpful in the context of adapting to the museum's particular learning context. The design shift to focusing on the creative arts rather than the technology was one that equally fitted into the ethos of the Exploratorium. The openness of the teenagers and the museum staff allowed for exploration in a playful and creative way. There was no expert direction from teachers or educators working in the field. Like the learning that the Exploratorium museum promotes, our project was self-directed. We had a quiet space allocated to us once we began, the project was accommodated and supported throughout by the museum. This afforded us invaluable freedom in our choice of what we did and where we located ourselves within the museum.

## 9.2 Design Model

As a result of DC3 intervention and processes, a new model was produced as a working adaptation of the *TECHe* model, one which reflects the in-situ learning of the local context. The *TECHe* framework and the adapted *Sense of Place* model share the same five criteria (materiality, digital augmentation, engagement, sociality, playful learning). However the *Sense of Place* prototype model has seven design sensitivities (Fig. 9.1). The proximal output of the design research adaptation is the intervention itself which is described in DC3. The distal output is the set of design sensitivities and guidelines which

are outlined in Table 9.1, and are followed by the listing of the design informants. In chapter seven the *TEChE* design model partially answered the second supporting question of this thesis ‘*What are the core design features of a creative learning model for heritage engagement?*’ The *Sense of Place* model completes the requirements for this question. Together both models provide evidence for a creative learning model for heritage engagement.

Table 9-1 Sense of Place Design Sensitivities

Design Sensitivities: Sense of Place Pedagogy		
<b>Materiality</b>		
DP1	<b>Dialogue and Discussion</b>	<ul style="list-style-type: none"> <li>○ Co-construct knowledge through discussing what constitutes place</li> <li>○ Intersubjectivity – come to shared understandings on place</li> <li>○ Making connections to young people’s everyday places</li> </ul>
<b>Digital Augmentation</b>		
DP2	<b>Public Presentation</b>	Provide support and ethical information for young people when recording video for public presentation
DP3	<b>Technology activities at home or in-place</b>	<ul style="list-style-type: none"> <li>○ Use technology to integrate out-of-museum, at-home, in-place experiences into meaning making activities</li> </ul>
<b>Engagement</b>		
DP4	<b>Meaning making through Art</b>	<ul style="list-style-type: none"> <li>○ Encouragement is required for the creative process of a blank page to a finished meaningful art piece</li> <li>○ Provide conditions for deep focus and flow conditions</li> </ul>
<b>Sociality</b>		
DP5	<b>Peer Learning</b>	<ul style="list-style-type: none"> <li>○ Sharing in the creative learning process, extending ideas and gaining confidence in the process through peer-learning</li> <li>○ Making connections to each other</li> </ul>
<b>Playful Learning</b>		
DP6	<b>Positive Affect</b>	<ul style="list-style-type: none"> <li>○ Fun, joyful, enjoyable, voluntary, non-stressed learning</li> <li>○ Providing conditions for creative and peer learning</li> <li>○ Provide cognitive and affective conditions to provide optimal flow ‘in the zone’ experiences</li> </ul>
DP7	<b>Student Autonomy And Agency</b>	<ul style="list-style-type: none"> <li>○ Self-directed and independence in learning – encourage free expression</li> <li>○ Freedom to participate, move, voice and choice</li> </ul>

### 9.2.1. Materiality

In this creative arts place learning model, it is possible to engage with place without a physical concrete experience with local heritage/place as the literature suggests is necessary for place engagement. Admittedly it is not to the same depth of engagement but nevertheless within the constraints of holding a PBL programme within a museum it is possible. In a situation where physical place is not possible, a creative dialogic approach should initiate talk, discussion, debate resulting in

new understandings on place for young people. Young people can begin to develop awareness through weekly activities in place and begin to see their neighbourhoods in a new light. A **dialogic approach** is not instant understandings, it takes time, but evolving understandings start to become more meaningful as young people talk about, and make sense of people and places in their communities. Through this process of sense and place making young people should further develop their sense of place, identity, belonging and well-being.

### 9.2.2. Digital augmentation

Young people have busy overloaded lives with little time for extra-curricular activities and hobbies. Therefore any **cell phone creative activities** for carrying out at home or in their own neighbourhoods should be simple and enjoyable, meaningful and voluntary. The facilitator should facilitate printing of local photographs young people may want in their art works. In this context we corresponded by email. Any photographs the teenagers planned for inclusion in their artefacts were emailed to me for free colour printing and integrated into their physical artefacts. When filming their interpretations on place for a public presentation, participation should be voluntary and non-judgmental. Young people should be informed where the video is stored, for how long and who will have access to it. Support should be offered in developing their narrative on their final art piece.

### 9.2.3. Engagement

Similar to the *TECHe* design model the playful learning environment of DC3 should allow for free play, and open and creative interpretation of representing place. The atmosphere should be one of **positive affect**, not only for its interrelatedness to rich social interactions that **foster peer learning** but also for its contribution to providing opportunities for **flow**. Approaching the creative arts process from a joyful playful approach will help with the uncertainty and the anxiety a blank page can bring. While imagining, creating, playing, sharing, and reimagining (Resnick 2007a) bringing **a blank page to a meaningful artefact** offers an authentic way of place meaning making for young people.

### 9.2.4. Sociality

It is important for the **creative learning process** young people share their processes and work with each other towards a common goal (Resnick 2007a). This provides additional opportunities to encourage **connectedness** between peers who can contribute to another peers zone of proximal development. Although maintaining a balance between guidance and allowing young people find their own individual ways of expression through art can be difficult. There is a fine line between guidance and allowing free expression to develop. However, the benefits when they finally make a meaningful

artefact outweighs all potential flux. Playful learning indicators such as pride, excitement, empowerment and ownership will follow.

9.2.5. Playful learning

As discussed in the *TEChE* model chapter seven **agency and autonomy** are vital to a playful learning environment. Young people should want to be involved, and therefore the programme should be voluntary. In a situation where the teenagers are employed by the museum, and participating in the programme may hold perceived benefits to themselves, it is important that they know they can leave without judgment and that the public aspect of ‘baring their souls’ through public viewing of their art works is completely voluntary. Apart from freedom to attend weekly sessions or not, freedom to choose their art mediums, materials and subject matter are paramount. Feedback from the young people is essential in a weekly programme as to ensure continued engagement and interest with the programme. Equally important is an educator following through with design changes following any constructive criticism.

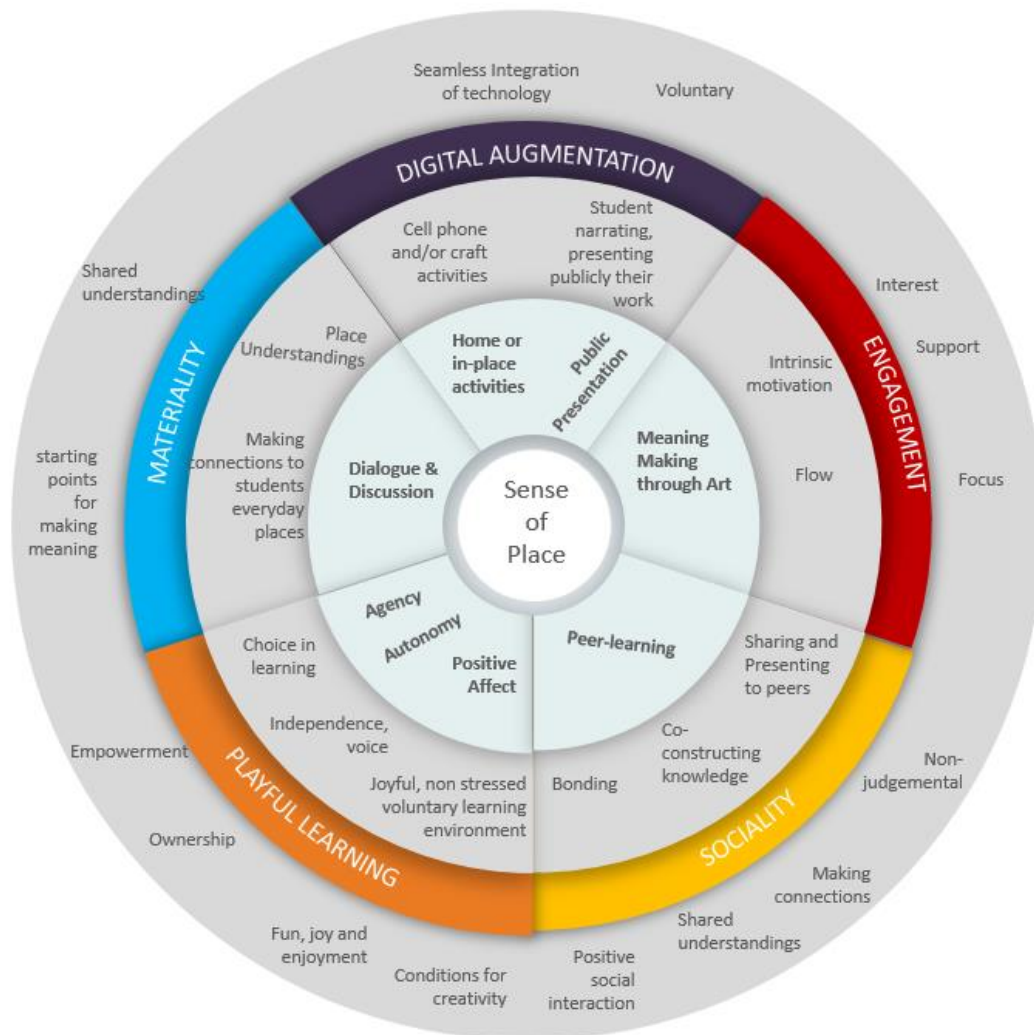


Figure 9-1 Sense of Place Design Model

### 9.3 Design Informants

In order to successfully adapt a working model and design heritage engagement within a different learning context there are certain conditions that should inform the design. These four elements are outlined below.

#### **1. Teenager's voice**

DC3 was very much a dialogic approach with an aim for young people to make meaningful understandings of place. Therefore it is important young people feel comfortable with talk, dialogue and debate. It can be an abstract and unclear process. Asking young people on a weekly basis about their concerns will ensure that dialogue the following week will address any concerns and clear up any misunderstandings.

#### **2. Learning spaces**

The physical requirements of learning spaces are important in a design for playful learning. During our time in the museum we made use of a public open space in the Fisher Bay Observatory but a small private board room proved a better option and more conducive to talk and making art. The space should be made welcoming for the teenagers before they arrive. Lay out their spaces in advance of meeting with their previous weeks work. In ensuring an enjoyable and non-stressed atmosphere, allow music be played, provide snacks and water, and all art supplies for the young people.

#### **3. Local school and museum perspectives**

The research must be sensitive to the requirements and needs of the museum. Ensure relevant departmental heads and curators are regularly kept up to date with the process and are invited to drop in at any point in the programme. Invite all stakeholders to public presentations. Ensure any publications are respectful to the museum and its existing learning programmes.

#### **4. Ethical issues**

The young people in this learning context are employees of the museum. However, their participation in this project is voluntary and meant to be enjoyable, not seen as another aspect of work. To avoid any power issues, ensure transparency from the beginning. Take any formality out of the programme. Aim for informal interactions between young people and facilitator. Regularly remind teenagers there is no need to remain in the programme if they so desire. If they miss a week or two ensure they know that is okay, they must want to come for its own sake. Ensure at end of a public programme that any

art works are returned to the individuals or to their department manager. Common courtesy would include thank you emails/cards to the participants. Ensure young people's privacy is maintained after the completion of a programme and with any further publications.

### 9.4 Future Adaptations

DBR addresses local problems in real world learning environments. The design was changed to suit the local learning environment. Some of the design sensitivities were marginally changed and some changed significantly. Some were not relevant in a new learning setting. DBR results and outcomes cannot be predicted because each intervention is unique but multiple interventions can show 'tendencies' to guide decision making and setting of parameters (Confrey 2006). Therefore if this study was replicated and improved upon it would advance the theoretical knowledge on place, especially as there is a dearth on literature on PBL in museums (Kalessopoulou 2019). Whereas this research was carried out within the confines of a museum, it holds potential for future research in extending the inquiry on place to home learning, online learning or through outreach in 'place' in different neighbourhoods. Whereas the Exploratorium have excellent existing community educational outreach programmes, as far as I am aware they are mainly focused on science, technology and engineering. If I was to carry out this study again with the same parameters, I would plan to include more technology activities that participants could carry out outside the museum in their own neighbourhoods. More engagement with their physical place may increase their place awareness, leading to positive benefits in the care of their places. The creative arts were a successful way of making sense of place, and were ideally suited to this particular learning context. In another setting, all could be different again. This cycle has shown how a model can be tried and tested in a much different learning setting and retain its core aims, which in this case is to engage young people with heritage and place.

### 9.5 Chapter Summary

A core aim of DBR is for models to be consulted and used by other educators and practitioners. This chapter outlined the process of the adaptation of the *TEChE* design model carried out in Ireland to the *Sense of Place* design model carried out in the USA. There was significant differences between the learning contexts of DC1 and DC2 (*TEChE* model) and that of DC3 (*Sense of Place* model). Methodological changes were required to adapt the model. A dialogic approach using pen and paper as a technology was employed in DC3. The proximal output of the design research adaptation is the intervention itself which is described in DC3. The distal output is a new set of design sensitivities and guidelines and informants. The *Sense of Place* model completes the requirements for the second



supporting question of this thesis '*What are the core design features of a creative learning model for heritage engagement?*' Both models retained the core aim of this thesis to engage young people with their heritage and place.

The following chapter will summarise the findings of the previous three design cycles which have endeavoured to explore how learningful play, a combination of play, learning and technology can enhance children's engagement with heritage. The chapter will give an overview of the *TECHe* design model and its relationship to the *Sense of Place* prototype model. The chapter will outline the contribution to research and detail future research in the field.

## Chapter 10 Conclusions

### 10.1 Summary of Thesis' Structure

This thesis explored how technologies (digital and otherwise) can be employed to enhance young people's engagement with cultural heritage and place in both schools and museums. The thesis has produced two working models that other educators, design researchers, and museum and educational technologists can adopt and adapt to develop learning programmes to engage young people with heritage and place. The *TECHe* model crosses both the formal and informal learning contexts. The *Sense of Place* model adapts the pedagogic approach for use in a museum. Through the learningful play framework this thesis aimed, through the course of three design cycles, to produce the prototype models, design sensitivities and design informants to engage young people with heritage and place. Prior to this research no models for heritage engagement crossing the context of both school and museum existed. The aims of this research were:

- To explore existing practices of, and engagement with heritage education in schools and museums;
- To foster young people's sense of place and belonging through developing their awareness, understandings, and engagement with heritage and place;
- To explore how a play-based approach to heritage learning can be employed in a traditional formal classroom and the informal setting of the museum;
- To demonstrate how learningful play (play, learning and technology) can be integrated effectively into heritage learning in schools and museums to enhance engagement with heritage;
- To identify and articulate the core criteria of a successful interactive creative heritage learning experience to foster engagement in children;
- To apply these criteria to the evolving design of heritage engagement;
- To communicate and evaluate children's interactions, experiences and engagement with heritage and place.

## Chapter Ten Conclusions

In chapter one I outlined my rationale for the research. I proposed the following research questions to be explored through subsequent chapters:

How can we optimally design for children's engagement with cultural heritage using technologies across formal and informal learning environments?

(a) What is the potential of play-based approaches to enhance heritage and place engagement across informal and formal learning environments?

(b) What are the core design features of a creative learning model for heritage engagement?

Chapter two outlined the complexities of heritage and place and the philosophical underpinnings of both concepts. The review of literature outlined existing formal and informal practices in heritage education across schools and museums, normally under the umbrella of history and/or geography. Additionally, chapter two examined the literature on learningful play. I examined the role of technology in young people's lives and the technological benefits and challenges to young people were detailed. The review clarified important characteristics of playful and creative learning, and effective pedagogical approaches for heritage engagement in museums and schools. Finally the review identified important methodological requirements necessary for this thesis' design interventions.

In chapter three the *TECHe* conceptual framework was set out as five lenses of engagement derived from the literature review. The five lenses of engagement *materiality*, *digital augmentation*, *engagement*, *sociality*, *play-based learning* are related to theories of constructivism, social-constructivism, constructionism, flow and place-based learning.

In chapter four I outlined my educational paradigm, and my methodology for answering the research questions. I explained my rationale for employing a DBR methodology. I chose DBR for its flexible, iterative, interventionist approach in educational research and its suitability for educational practice in authentic learning settings. Data collection and data analysis methods were detailed as well as ethical considerations.

In chapters five and six the first two design cycles are outlined. DC1 was an exploratory pilot design cycle. This included one school and one museum intervention with children aged 10-13 years. A theory of play emanated from the exploratory research in the school cycle which was confirmed in the museum intervention. In chapter six (DC2) I carried out the principal study which consisted of four interventions at three schools and one museum respectively. An optimal design for heritage engagement was found by the end of the third school, which was then tested out in the museum environment.

In chapter seven I outlined the criteria for the *TECHe* design model for learningful heritage play and the model's design sensitivities. The criteria for the model were based on the *TECHe* conceptual

framework. The *TEChE* design model and design sensitivities arose from the culmination of DC1 and DC2. Additionally, I outlined the key design informants and resources needed to enhance children's engagement and learning with heritage.

Chapter eight outlined the third design cycle DC3. Unlike the previous design cycles this was carried out in an American museum. The eight participants in this cycle were teenagers and part-time employees of the museum. Whereas place-based learning ideally happens outside and in place, this cycle aimed to develop young people's sense of place from within a museum environment. Therefore, the teenagers and I took a dialogic approach to understanding place.

Chapter nine outlined the adaptation of the *TEChE* design model and sensitivities to the *Sense of Place* design model and sensitivities. The criteria for the model were based on the *TEChE* conceptual framework and the *TEChE* model. There are significant differences between both learning contexts and the new model positioned itself on the dialogic end of the heritage interactions continuum, detailed in the following chapter.

Finally, this concluding chapter (ten) summarises the thesis, gives an overview of the two prototype design models and the heritage interactions continuum, and outlines the contributions of this research and opportunities for future research. On the heritage continuum, heritage and place meanings and understandings span the tangible (material) to the intangible (dialogic). Both the original design model and the adapted design model are positioned on the heritage continuum. The *TEChE* model lies towards the material end, and the *Sense of Place* model lies towards the dialogic, constructivist end.

### 10.2 Answering the Research Questions

This thesis has shown how learningful play can be effectively designed to enhance children's engagement with heritage. The main research question 'How can we optimally design for children's engagement with cultural heritage using technologies across formal and informal learning environments?' has been answered through the learning processes of three design cycles, their resulting models and design sensitivities. The research has explored and outlined the potential of a play-based pedagogic approach to heritage education, answering the first supporting research question 'What is the potential of play-based approaches to enhance heritage and place engagement across informal and formal learning environments? The design processes have demonstrated how learningful play can be integrated effectively into heritage learning in schools and museums. Through an iterative design process the two prototype models have identified the core criteria of successful heritage learning experiences to foster engagement in children. Both models answered the second supporting question of the research study 'What are the core design features of a creative learning

model for heritage engagement?’ The research has shown how learning conditions can develop young people’s sense of place, belonging, awareness and understanding of their heritage and place. It has shown how technology can create novel interactive possibilities for children in schools and museums. It has shown how these technologies can be integrated with other activities such as field trips to enrich the overall experience of children. Seymour Papert, a key theorist in this research, explained how technology was similar to a carrier of seeds “whose intellectual products will not need technological support once they take root in an actively growing mind” (1980, p. 3). This thesis has shown how technology in practice can contribute to an effective learning programme for heritage engagement.

### 10.3 TEChE and Sense of Place Design Models

The design criteria for a successful model for heritage engagement was set out in chapter seven. This model (TEChE) based on the *TEChE* framework (materiality, digital augmentation, engagement, sociality and playful learning) and literature proposed twelve design sensitivities and eight design informants. Although challenging, central to DBR is that prototype models are transferable to other local educational settings (McKenney and Schunn 2018), and for the model to have impact in a new setting (Barab 2006). However, most design researchers admit frustration as their models are rarely employed in practice (Pieters and de Vries 2008). Projects rarely ‘live on past the lifecycle of single projects’ (McKenney and Schunn 2018, p. 2). In this research the *TEChE* model was adapted in an American museum setting. This resulted in a new prototype educational design model (*Sense of Place*), a new set of design sensitivities and design informants. This research has shown how a model can be tried and tested in a significantly different learning setting and retain its core aims, which in this case was to engage young people with heritage and place. The design criteria, sensitivities and informants are detailed in chapters seven and nine respectively. An overview of both models is found in Table 10.1.

## Chapter Ten Conclusions

*Table 10-1 Core Design Features of a Creative Learning Model for Heritage Engagement*

Comparison of the two design models for creative engagement with heritage and place			
Design Criteria for both: <i>TECHe</i> framework (materiality, digital augmentation, engagement, sociality, playful learning)			
<i>Principal DBR Study Model</i>	<i>Details</i>	<i>Adapted Model</i>	<i>Details</i>
<b><i>TECHe</i> Design Model</b> (Fig.7.2)	DC1 (pilot) and DC2 (Principal Study)	<b><i>Sense of Place</i> Design Model</b> (Fig.9.1)	DC3
	Ages of children 10-13		Ages of young people 15-18
Twelve Design Sensitivities: Authentic Learning Environment Material culture as starting point for engagement Supports & Scaffolding Free Digital Play Ubiquitous technologies Engagement Dialogue and Discussion Positive team collaboration Positive Affect Guided & Free Play balance Child Autonomy and Agency	4 Schools 2 Museums  N=123 (School N=97, Museum N=26)	Seven Design Sensitivities: Dialogue and Discussion Public Presentation Technology activities at home or in-place Meaning making through Art Peer Learning Positive Affect Student Autonomy and Agency	One Museum   N=8
Eight design informants: Children's voice Curriculum based learning experience Wider professional Heritage context Learning spaces Local School and Museum Perspectives Collaboration Ethical Issues External validation		Five design informants: Teenager's voice Learning spaces Local School and Museum Perspectives Ethical Issues	

In understanding and interpreting heritage, a continuum exists between the tangible and the intangible. Each context in this thesis could be positioned on different points along the continuum. Schools are tied to curriculum and link to the material tangible end, whereas museums although they hold tangible objects, have more scope to move to a dialogic/intangible/constructivist approach. This thesis provided opportunities for school children to creatively interpret their local tangible heritage and through heritage and place-making move along the continuum to the

intangible/dialogic/constructivist end and construct their own meanings. Figure 10.1 shows the positioning of the two prototype design models from this research, *TEChE* and *Sense of Place* on the continuum. Both models add different dimensions to how heritage and place can be interpreted and interacted with in the context of learning. Together both models provide evidence for a creative learning model for heritage engagement. In future work, this continuum could be explored in more detail as a framework for designing interactive educational technologies for children with regard to cultural heritage.

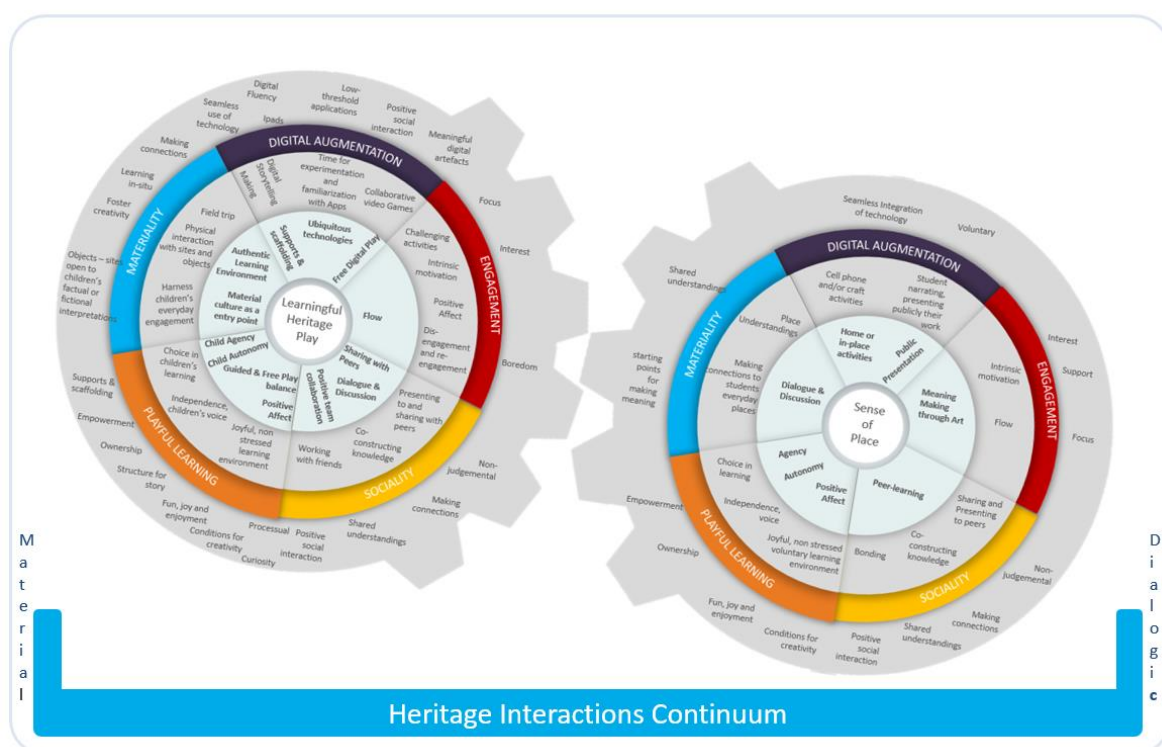


Figure 10-1 Design Models on a Heritage Continuum

### 10.4 Significance of Contribution to Research

The thesis has made three contributions to the understanding of heritage and place pedagogies to enhance young people’s engagement with heritage.

1. There are numerous DBR studies carried out in the natural settings of schools (Beer 2018) less in museums (Reisman 2008) and few (e.g. work of Hall 2004) that cross both the formal and informal learning environments. The main contribution of this research is this study’s example of two designs that crossed formal and informal learning contexts and show how heritage engagement is fostered

through play, learning, technology, creativity and cultural heritage interactions. This research shows the process of designing the *TECHe* model across schools and museums, and its adaptation to a new localised museum context resulting in a new model *Sense of Place*. Both models offer potential for educators in schools and museums to integrate into heritage and place learning programmes. The two main outputs of the Mc Kenney and Reeves educational design research model as outlined in Fig. 7.1 and adapted in Fig. 10.2 are listed as Maturing Interventions (*proximal*) and Theoretical Understandings (*distal*). Thompson Long and Hall (2015) added a third output, a *medial* dimension, which refers to resources that connect the proximal and the distal. Adaptable medial resources include pedagogic materials such as activities, worksheets, timetables, handouts etc. The contribution and outputs of this research design, carried out over three design cycles are:

- *Proximal* – the intervention processes and young people’s creative, collaborative, digital and non-digital artefacts
- *Medial* – pedagogic materials -worksheets, handouts, activities
- *Distal* - theoretical understandings embedded in design models and sensitivities

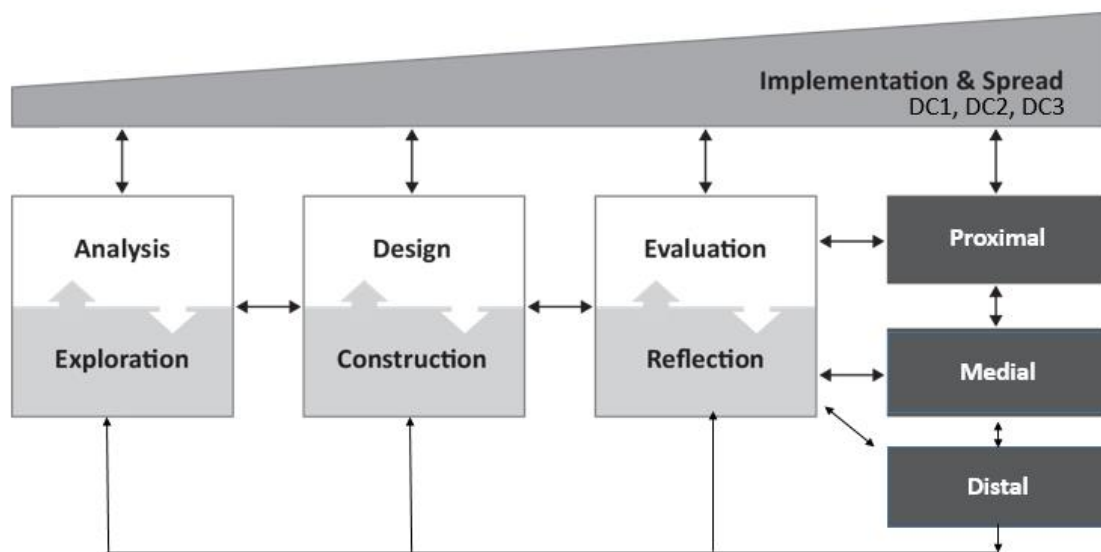


Figure 10-2 Adaptation of McKenney & Visscher-Voerman 2013 Design Research Model

Additionally this research contributes to the research-practice gap in DBR as highlighted by McKenney and Schunn (2018) and Pieters and de Vries (2008). In the course of a Ph.D. many researchers design a model but may not get the opportunity to test the model out in a different educational context or have their findings used to inform practice. Most educational design research models become once-off projects and are not adapted into other educational settings (McKenney and Schunn 2018). In this research, I designed a model and tested it in a significantly different learning context, thereby



contributing to the advancement of educational design research. By adapting an Irish contextual model to a different context, I had the opportunity to reflect on how a design travels and to better understand on the role educational designers play in adapting these models (McKenney and Schunn 2018). By describing the process of adaption, and its limitations, issues and challenges, I was able to glean insight into the educational design process. This can be of support to other educators and design researchers. These design guidelines should provide a working framework for future adaptations by others.

2. There is a dearth of literature on place-based learning (PBL) in museums (Kalessopoulou 2019) and few examples of PBL practices in museums (e.g. work of Utt and Olsen 2007). In this research, I carried out DC3 as a museum PBL programme. Leading writers on PBL and environmental issues, Gruenewald & Smith (2008) point to how little is written on the role of education in PBL. Education is needed to develop awareness. In this research, I have contributed to the research on PBL in museums. Developing awareness of heritage and place in young people was an aim of this research, therefore the research design processes and outputs augment existing theoretical and practical knowledge on place and contribute to the advancement of PBL research and practice.

3. The research on learning in museums has mostly focused on science centres. Few studies have explored learning in archaeology and history museums or educational programmes in museums (Andre et al. 2016). Andre et al. in their review of ten years of museum learning research found knowledge gaps in museum learning and stated how research findings from schools cannot be transferred to a museum because of the many differences in the learning contexts (2016, after Hooper-Greenhill and Mousouri 2000). This thesis aims to develop an iterative learning design that crosses both museum and school. In this research, findings are transferred to the museum, and subsequently are transferred to another school. Equally Andre et al. (2016) found very little is known about learning processes and learning experiences in museums. This thesis contributes to museum learning processes and knowledge and to the museum-school (formal/informal) research gap. Equally, this thesis provides new insights into the delivery of heritage education, taking into account curriculum needs of formal education and the current educational practices of museum contexts. Playful approaches to heritage are not the norm, therefore this thesis, by providing an analysis of playful processes contributes to improving heritage educational practices by closing the gap between school and museums.

### 10.5 Recommendations for Future Research in a Covid-19 world

Covid-19 has impacted education significantly. There has always been a disconnect between formal and informal learning settings and this will be worsened by the presence of Covid-19. Cultural heritage as a subject will be under threat from any lessening of both formal and informal learning practices. With informal learning spaces closed schools may end up, as they facing rolling closures, as the only option for heritage learning. In the context of this research closures bring challenges for the future of cultural heritage education. UNESCO has reported 1.5 billion learners across the globe have been affected by school closures due to the 2020 global pandemic (UNESCO 2020b).

Covid-19 may lead to permanent changes in heritage education. The Network of European Museum Organisations (NEMO) survey suggests museums will not be the same again after this pandemic (NEMO 2020). Museums and cultural heritage sites will have to rapidly change direction. Museums have had to shift online at unthinkable speed and many staff members do not have the necessary skills to transfer existing programmes or develop new digital programmes (Culture 24 2020). Culture 24, a UK organisation that supports the development of digital skills and literacies in museums and heritage institutions stated in their Covid-19 report that ‘people need help urgently’ (2020). NEMO recommend that investments are made in digital cultural heritage and that staff who normally carry out educational programmes onsite be provided with training and resources to do so in the online environment (2020).

My research can be adapted for future learning programmes, in schools, museums, libraries or at home. NEMO have pointed out that ‘Fun, engaging and creative digital offers will be part of museums’ digital future’ but museums require resources to compete with other digital services and provide state of the art cultural experiences online (NEMO 2020). Likewise, schools may need digital resources and learning programmes to ensure they can offer children a holistic well-rounded education. In the rush to the digital realm a recent OECD report has highlighted the importance of physicality to children’s education. Children need to move, play and actively learn (OECD 2020). Models such as this thesis’ *TEChE* model which blends physicality and low threshold technologies can be quickly adapted to online school and museum educational programmes. Future research could take the design models and adapt them to develop a new curriculum for heritage, one that makes use of informal learning practices, the physicality of place, as well as digital affordances. Cultural heritage is worthy of its own place in an Irish school curriculum rather than being interspersed between subjects as is the current practice.

The learning landscape will be very different going forward. I hope this thesis will be helpful in envisioning a new future for education. This thesis recommends that cultural heritage remains an important focus in education and finds a place in the changing landscape of learning for children.

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## Chapter 12 Appendices

### *Appendix A Heritage Definitions*

#### **Heritage Definitions**

<b>Terms</b>	<b>Definitions</b>
<b>Cultural Heritage</b>	Cultural Heritage is the legacy of physical artefacts and intangible attributes of a group or society that are inherited from past generations, maintained in the present and bestowed for the benefit of future generations (UNESCO n.d.-a). Cultural heritage consists of creative and cultural resources of a tangible or intangible nature that are of value to society (European Commission 2018b). These resources can be “natural sites with cultural aspects such as cultural landscapes, physical, biological or geological formations” (UNESCO n.d.-b).
<b>Tangible Heritage</b>	Tangible heritage includes monuments, buildings, artifacts, and historic places, etc., which are considered worthy of preservation for the future. These include objects significant to the archaeology, architecture, science or technology of a specific culture” (UNESCO n.d.-a). These monuments, sites and groups of buildings are ‘of historical, aesthetic, archaeological, scientific, ethnological or anthropological value” (Kirshenblatt-Gimblett 2004). Tangible heritage includes movable cultural heritage (sculptures, paintings, manuscripts, coins) and immovable cultural heritage (archaeological sites, monuments etc.) (UNESCO n.d.-b).
<b>Intangible Heritage</b>	Intangible heritage includes oral traditions, social practices, festive events, rituals, performing arts, knowledge and skills to produce traditional crafts or the knowledge and practices concerning nature and the universe (UNESCO 2003)
<b>Cultural Heritage Site</b>	A cultural heritage site can be defined as an archaeological site, architectural complex, place, locality, settlement area, natural landscape, or standing structure that is recognized and often legally protected as a place of cultural and historical importance (ICOMOS 2008).
<b>Landscape</b>	Landscape can be defined as “an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors” (Department of Arts Heritage & the Gaeltacht 2015)
<b>Natural Heritage</b>	Natural Heritage can be defined as physical, geological and biological features; habitats of animal species, threatened plants and areas of value on aesthetic or scientific grounds or from the perspective of conservation (Kirshenblatt-Gimblett 2004)

Appendix B Children’s Drawings -Coding Scheme DC1

**Coding Scheme: Children’s Drawings - Design Cycle One**

(After Xu, D., Read, J. C., Sim, G. & McManus, B. Experience It, Draw It, Rate It – Capture Children’s Experiences with Their Drawings)

Each image is numbered in the comment section of the online document and contains a short description of the context or the drawing

Coder \_\_\_\_\_ SmH  FC  TH



Themes	Fun	Place: References to Subject matter (Heritage, History)	Making Personal Connections (Everyday Engagement)	Technology				
<i>*Written reflection from child also included for context</i>								
<b>Evidence</b>	Emoji, thumbs up, smiley face, heart, coloured, exclamation marks*  Words: LOL, Fun, Enjoyment, Excitement, love, playing	Subject matter images  Words: Learn, did not know, place	Related to children’s lives and culture  Words:	What is the ‘message’ most closely related to regarding the technology in this drawing?  Words: Ipad, digital, computers, tech, technology,				
<b>Score &amp; Comment</b>	Absent (0 point) Present (1 point )	Not evident (0) Possibly evident (1 point) Evident (2 points ) Highly evident (3 points)	Not evident (0) Possibly evident (1 point) Evident (2 points ) Highly evident (3 points)	Fun (F) Personal Connection (PC) Heritage Site/Place (P) Technology (T)				
Image No.	Code No.	Comment	Code No.	Comment	Code No.	Comment	Code No.	Comment (What is the message?)
1a_1								
1a_2								
1a_3								
1a_4								
1a_5								
1a_6								
1a_7								
1a_8								
1a_9								
1a_10								
1a_11								
1a_12								
1a_13								
1a_14								
1a_15								
1a_16								
1a_17								

*Appendix C Researcher's Reflections – DC1*

Writing Extract from Reflections

*On trying technology in the classroom*

"Anyway, on logging on to the whiteboard, suddenly nothing worked, website was blocked by the PDST ( at dept..of education). Haven't had time to investigate fully as yet but it appears they control the internet for schools. Someone told me since a school can opt out. I was disappointed when that wouldn't work as I had an activity built in for them to get to know and to use the website. The school has to request access to the website to the PDST and this could take up to 2 weeks. The teacher mentioned it could be cut off again at any time. Here I was immediately thinking of power issues and the control held over individual schools, and especially if introducing any kind of technology. I'm sure though teachers that want to bypass these regulations must have a workaround, or maybe recommendations are followed. I would like to know more about this issue as this is a major obstacle for the likes of external educators to come into the school setting"

*Inner dialogue on first experience of research within a naturalistic setting- the classroom*

"All in all it was a very frustrating experience. Teacher2 didn't seem to be at all phased by it but I was embarrassed at what I felt was a waste of his teaching time. The whole experience left me drained and I was good for nothing that day and the next, I wasn't able to write any reflections until today Sunday. Maybe that's a bit dramatic but I genuinely felt it was a disaster. I didn't know whether I should email Teacher2 and say anything but then I said I wouldn't and I leave it. What I want to do now is to be prepared for things not working and have the following week practically ready too in case we need it. I wasn't prepared for anything else only what I had prepared and I was angry at myself too for not being prepared and having to wing it. It's not something I'm comfortable with. I feel a sense of responsibility to the class and Teacher2 as I feel I am taking their time, so therefore I am determined not to let that happen again and be more directed in my approach in order to get things done."


Reflection Art – Researcher

As "reflection represented in writing, for example, will be different to that encompassed in a drawing" (Moon 2004) I found interpreting my own Art to be a sort of triangulation of my written reflections. It's blue. Enough said!



*Appendix D Reflection Journal – DC2*

All children in DC2 received a reflection journal to bring home with them. I either collected these in the school a few days afterwards or gave stamped-addressed envelopes to the children or teachers to post them to me. Excerpt below:

 <p>This belongs to</p> <p>.....</p>	<p>What was your favourite part of the 2 days?</p>
<p>What was the hardest thing you did? Why?</p>	<p>What was the most surprising thing you found over the 2 days?</p>

Appendix E Fun Toolkit – Fun Sorter & Again-Again Table

DC1– School No. 1.1

1. FUN SORTER – Which part of project was the most fun? Number 1 to 6, number 1 being the most fun

Images have been removed due to Copyright restrictions

Most Fun	Visiting the sites in Galway	Looking for and finding information about medieval life	Thinking of and writing the story	Working in teams	Building with Minecraft	Recording Script
Number						

3. AGAIN-AGAIN Table  
Would you like to do it again?

	Yes	Maybe	No
Go outside school and visit sites			
Search for information on your project			
Work together on teams			
Play Minecraft			
Use Minecraft for History class			
Use Technology (example Ipad, tablets) for History class			
Write a script			
Record a Script			

1. FUN SORTER – Which part of project was the most fun? Number 1 to 6, number 1 being the most fun

Images have been removed due to Copyright restrictions

Most Fun	Visiting the site Galway	finding information about medieval life	writing the story	Minecraft	Script
Number	5	6	4	2	3

3. AGAIN-AGAIN Table  
Would you like to do it again?

	Yes	Maybe	No
Go outside school and visit sites	✓		
Search for information on your project	✓		
Work together on teams	✓		
Play Minecraft	✓		
Use Minecraft for History class	✓		
Use Technology (example Ipad, tablets) for History class	✓		
Write a script	✓		
Record a Script	✓		

DC2– School 2-3

Fun Sorter

Images have been removed due to Copyright restrictions

Most Enjoyed	Learning about the my place	Looking for and finding information for my story	Thinking of and writing the story	Working with teams	Making the story	Using ipads	Taking photos	Using Apps for History	Learning outside of school
Number these 1 to 9. (No 1 Being Most Enjoyable)									

	Yes	Maybe	No
Work together on teams			
Search for information on your story			
Visit my town and learn about my place			
Use Technology (example Ipad, tablets) for learning			
Write a script			
Making a digital story			

DC2– Schools S2.4 & S2.5

Fun Sorter

Images have been removed due to Copyright restrictions

Most Enjoyed	Learning about the my place	Looking for and finding information for my story	Thinking of and writing the story	Working with teams	Making the story	Using ipads	Taking photos	Using Apps for	Learning outside
Number these 1 to 9. (No 1 Being Most Enjoyable)									

AGAIN-AGAIN Table

	Yes	Maybe	No
Use apps for history Class			
Work together on teams			
Search for information on your story			
Visit my town and learn about my place			
Use Technology (example Ipad, tablets) for learning			
Write a script			
Making a digital story			
Learn in a different place from school (example heritage centre, castle)			
Taking Photos			

**Fun Sorters & Again-Again Tables – Museum – DC1**

	Images have been removed due to Copyright restrictions								
<b>Most Enjoyed</b>	Learning about the meaning of objects	Looking for and Finding information for my digital piece	Thinking of and writing the story	Working with teams	Making a Comic	Using video	Using ipads	Taking images	Learning in a museum
Number these 1 to 9. (No 1 Being Most Enjoyable)									

+

<b>AGAIN -AGAIN Table</b>	<b>Yes</b>	<b>Maybe</b>	<b>No</b>
Learn with objects			
Search for information on your project			
Work together on teams			
Use video to show what I learn			
Use comics to write a story			
Use Technology (example Ipads, tablets) for learning in a museum			
Write a script			
Make a digital story			

**Fun Sorters & Again-Again Tables -Museum – DC2**

	Images have been removed due to Copyright restrictions								
<b>Most Enjoyed</b>	Learning about objects	Looking for and finding information for my digital story	Thinking of and writing the story	Working with teams	Making a digital Story	Using apps for history or heritage learning	Using ipads	Taking images	Learning outside of school (like a museum)
Number these 1 to 9. (No 1 Being Most Enjoyable No 9 being least enjoyable)									

<b>AGAIN -AGAIN Table</b>	<b>Yes</b>	<b>Maybe</b>	<b>No</b>
Learn with objects in a museum			
Search for information on your project			
Work together on teams			
Make a video to tell a story			
Using apps for History and heritage learning			
Use comics to write a story			
Use Technology (example Ipads, tablets) for learning			
Write a script			
Make a digital story			
Using ipads			
Taking photos			



Appendix F Questionnaires

The Smileyometer, a Likert type scale used to measure expectations prior to and after an experience (Read and Mac Farlane 2006) was applied to the pre and post intervention questionnaires. A happy face was listed YES/AGREE, a straight face a straight line was related to MAYBE, NOT SURE or DON'T KNOW, an upside smile is related to a NO/DISAGREE. Emojis from wpclipart.com (public domain clipart)

The questionnaires from all cycles are listed below:

DC1 S1.1 Pre-Questionnaire

Please tick the box that most describes how you feel about each statement

Thank you for helping with this project!

History is boring

      
 Yes/Agree  Don't care/Not Sure  No/Disagree

I like when it is time for History

      
 Yes/Agree  Don't care/Not Sure  No/Disagree

I am interested to learn new things in History

      
 Yes/Agree  Don't care/Not Sure  No/Disagree

History time in class is usually fun

      
 Yes/Agree  Don't care/Not Sure  No/Disagree

Does working in a team help me learn?

      
 Yes/Agree  Don't care/Not Sure  No/Disagree

I am interested to learn new technologies

      
 Yes/Agree  Don't care/Not Sure  No/Disagree

I am good at using computers

      
 Yes/Agree  Don't care/Not Sure  No/Disagree

History is more interesting when using computers

      
 Yes/Agree  Don't care/Not Sure  No/Disagree

I enjoy learning about the history of my area

      
 Yes/Agree  Don't care/Not Sure  No/Disagree

I know the history of my area well

      
 Yes/Agree  Don't care/Not Sure  No/Disagree

I like working in teams

      
 Yes/Agree  Don't care/Not Sure  No/Disagree

I learn things from the other children in my class

      
 Yes/Agree  Don't care/Not Sure  No/Disagree

Technology makes local history interesting

      
 Yes/Agree  Don't care/Not Sure  No/Disagree

I like exploring history in different ways

      
 Yes/Agree  Don't care/Not Sure  No/Disagree

I enjoy making things

      
 Yes/Agree  Don't care/Not Sure  No/Disagree

## Appendices

### My local community is important to me





Yes/Agree Don't care/Not Sure No/Disagree

### Heritage is important to people





Yes/Agree Don't care/Not Sure No/Disagree

### My heritage is important to me




















































Yes/Agree Don't care/Not Sure No/Disagree

## DC1 S1.1 Post-Questionnaire School

Please tick the box that most describes how you feel about each statement

























History is boring			
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I like when it is time for History			
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I am interested to learn new things in History			
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
History time in class is usually fun			
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I enjoy learning about the history of my area			
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I know the history of my area well			
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

1

I like working in teams			
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I learn things from the other children in my class			
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Does working in a team help me learn?			
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I am interested to learn new technologies			
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I am good at using computers			
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
History is more interesting when using computers			
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2

# Appendices

Technology makes local history interesting			
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I like exploring history in different ways			
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I enjoy making things			
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My local community is important to me			
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Heritage is important to people			
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My heritage is important to me			
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**Thank you for helping with this project!**

**Draw or write an answer. Write a poem. Whatever!**

What did you learn?

Do you think using technology was a good or bad way to learn about your place?  
Why?

Can you tell me more about what it means to have 'fun' when you are learning?

Anything else I should know? Thanks!!!

DC1 M1.2 Pre-Questionnaire – (L-R)

Emojis adapted from wpclipart.com (public domain clipart)

Please tick the box that most describes how you feel about each statement or write a short answer on the lines below. Thanks!

1. Were you ever in a Museum before? \_\_\_\_\_

2. Museums are interesting Yes Not Sure No

3. What are Museums for?  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

4. What do you think learning means?  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

5. What might be good about learning in a museum?  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

6. The museum is a good place to learn in a different way to school Agree Not sure Disagree

7. What might you learn this week?  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

8. Were you looking forward to coming? Yes Not Sure No

9. How could coming to the museum help you in your learning?  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

10. I enjoy learning history Yes Not Sure No

11. I like working in teams Yes Not Sure No

12. I learn things from other children Yes Not Sure No

13. Does working in a team help me learn? Yes Not Sure No

14. I am interested to learn new technologies Yes Not Sure No

15. Heritage is more interesting when using computers Yes Not Sure No

16. Technology makes a museum visit interesting Yes Not Sure No

17. I like exploring history and heritage in different ways Yes Not Sure No

18. I enjoy making things Yes Not Sure No

19. Understanding about the people who lived in my community many years ago is important to me Yes Not Sure No

20. Heritage is important to people Yes Not Sure No

21. My heritage is important to me Yes Not Sure No

Thank you for helping with this project!

# Appendices

## DC1 M2.1 Post-Questionnaire – (L-R)

Emojis from wpclipart.com (public domain clipart)

Please tick the box that most describes how you feel about each statement or write a short answer on the lines below. Thanks!

1. Will you visit a Museum again? .....

Why will you visit? .....

2. Museums are interesting

Yes  Not Sure  No

3. What are Museums for?

.....  
 .....  
 .....

4. What is good about learning in a museum?

.....  
 .....  
 .....

5. Could you learn what you learn in school in a museum? How could you do that?

.....  
 .....  
 .....

1

7. What did you learn this week?

.....  
 .....  
 .....

8 Did you enjoy the week?

Yes  Not Sure  No

What was enjoyable? What was not enjoyable?

.....  
 .....  
 .....

9 How did coming to the museum help you in your learning?

.....  
 .....  
 .....

2

This workshop was to help you learn more about your local history and heritage. How could I improve on making your learning experience better?

.....  
 .....  
 .....

15 Heritage is more interesting when using computers

Yes  Not Sure  No

16 Technology makes a museum visit interesting

Yes  Not Sure  No

17 I like exploring history and heritage in different ways

Yes  Not Sure  No

18 I enjoy making things

Yes  Not Sure  No

19 Understanding about the people who lived in my community many years ago is important to me

Yes  Not Sure  No

20 Heritage is important to people

Yes  Not Sure  No

21 My heritage is important to me

Yes  Not Sure  No

10 I enjoy learning history

Yes  Not Sure  No

11 I like working in teams

Yes  Not Sure  No

12 I learn things from other children

Yes  Not Sure  No

13 Does working in a team help me learn?

Yes  Not Sure  No

14 I am interested to learn new technologies

Yes  Not Sure  No

3

Thank you for helping with this project!

4

## Appendices

### DC2 S2.3, S2.4, S2.5, M2.6 Pre-Questionnaire

#### Thank you for helping with this project!

Please write a short answer on the lines below and tick the boxes that most describes how you feel about each statement. Thanks!

1. What do you think learning means?

---



---



---

2. What is a good way to learn? Why?

---



---



---

3. What might you learn when we do the project?

---








---








---

4. Will you enjoy this project? Why? Why not?

---

Do you <u>Agree</u> or <u>Disagree</u> ?	YES	NO	If you are not sure and would like to say more - you can write it here
 			
5. The heritage of where I live is interesting			
6. History is boring			
7. I am interested to learn new technologies			
8. I like working in teams			
9. I enjoy making things			
10. I learn things from other children			
11. Does working in a team help me learn?			
12. I enjoy learning history			
13. Heritage is interesting			
14. Heritage is more interesting when using computers			

2

Do you <u>Agree</u> or <u>Disagree</u> ?	YES	NO	If you are not sure and would like to say more - you can write it here
 			
15. Technology makes learning history and heritage more interesting			
16. I like exploring history and heritage in different ways			
17. Understanding about the people who lived in my place long ago is important to me			
18. My heritage is important to me			
19. Have I missed out on an interesting question?  What other question could I ask here to try and find out the best way children can learn about their heritage using computers?  Can you write a question for me?	Can you answer your question?		

Thank you!

3

# Appendices

## DC2 S2.3, S2.4, S2.5, M2.6 Post-Questionnaire

Please write a short answer on the lines below and tick the boxes that most describes how you feel about each statement. Thanks!

1. What did you learn during the project?

---



---



---



---



---

2. Did you enjoy this project? Why? Why not?

---



---



---













---



---

1

Do you Agree or Disagree?	YES	NO	If you would like to say more - you can write it here
 			
1. The heritage of where I live is interesting			
2. History is boring			
3. I am interested to learn new technologies			
4. I like working in teams			
5. I enjoy making things			
6. I learn things from other children			
7. Does working in a team help me learn?			
8. I enjoy learning history			
9. Heritage is interesting			
10. Heritage is more interesting when using computers			

Do you Agree or Disagree?	YES	NO	If you would like to say more - you can write it here
 			
11. Do you Agree or Disagree?			
12. Technology makes learning history and heritage more interesting			
13. I like exploring history and heritage in different ways			
14. Understanding about the people who lived in my place long ago is important to me			
15. My heritage is important to me			
What question would you ask if you designed this questionnaire? Can you write a question for me?	Can you answer your question?		

Thank you!

3

2

Emojis from wpclipart.com (public domain clipart)

# Appendices

## Appendix G Parents Online Survey DC2

### DC1– Parents/Guardians

Available at: <http://www.surveymzmo.com/s3/2910643/Digital-Heritage-Workshop-Feedback>

Not secure | [surveymzmo.com/s3/2910643/Digital-Heritage-Workshop-Feedback](http://www.surveymzmo.com/s3/2910643/Digital-Heritage-Workshop-Feedback)

### Digital Heritage Workshop Feedback

Sally McHugh, PhD candidate, School of Education, NUI Galway  
Held at Galway City Museum July 6th-8th 2016

1. As a parent/guardian could you share what was positive about your child's Museum workshop experience?

2. In your opinion how would you rate your child's learning of the following content?

	Learning about objects	Researching chosen objects	Brainstorming story ideas	Storyboarding/writing story	Creating their digital piece	Presenting their work
Rating	★ ★ ★ ★ ★	★ ★ ★ ★ ★	★ ★ ★ ★ ★	★ ★ ★ ★ ★	★ ★ ★ ★ ★	★ ★ ★ ★ ★

3. Would you have any suggestions to improve the structure of the workshop ?

4. Any other feedback would be welcome!

Never enter passwords or other sensitive information on this form. [Report Abuse](#)

### DC2– Parents/Guardians

Available at: <http://www.surveymzmo.com/s3/3707353/Digital-Heritage-Workshop-Feedback-July-2017>

Not secure | [surveymzmo.com/s3/2910643/Digital-Heritage-Workshop-Feedback](http://www.surveymzmo.com/s3/2910643/Digital-Heritage-Workshop-Feedback)

### Digital Heritage Workshop Feedback

Sally McHugh, PhD candidate, School of Education, NUI Galway  
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1. As a parent/guardian could you share what was positive about your child's Museum workshop experience?

2. In your opinion how would you rate your child's learning of the following content?

	Learning about objects	Researching chosen objects	Brainstorming story ideas	Storyboarding/writing story	Creating their digital piece	Presenting their work
Rating	★ ★ ★ ★ ★	★ ★ ★ ★ ★	★ ★ ★ ★ ★	★ ★ ★ ★ ★	★ ★ ★ ★ ★	★ ★ ★ ★ ★

3. Would you have any suggestions to improve the structure of the workshop ?

4. Any other feedback would be welcome!

Never enter passwords or other sensitive information on this form. [Report Abuse](#)



# Appendices

## Appendix H Teenagers Online Survey DC3

### DC3 - Teenagers

Available at: <https://www.mysurveygizmo.com/s3/5024975/Exploratorium-Explainers>

The Free Plan is limited to 100 responses per survey and 3 surveys. [Upgrade to go unlimited!](#)

[↓ Restore](#)

#### Page 1: A Sense of Place Project

1. Can you describe what your final finished piece of work meant to you? For example how did you feel about your finished piece, is there a story about your piece, are you proud of it, were you happy with your content, the medium you used to create it etc. **\*This question is required.**



2. Did you enjoy exploring place in this way? **\*This question is required.**

- No
- Yes
- Why? Please enter an 'other' value for this selection.  **\*This question is required.**



3. Did your awareness or understanding of your place change at the end of the project? **\*This question is required.**

- No
- Yes
- Can you tell me more? Please enter an 'other' value for this selection.  **\*This question is required.**



4. What is your opinion about the project process? **\*This question is required.**

- At the beginning it was clear
- At the beginning it was confusing
- At the end it was clear
- At the end it was confusing
- Can you tell me more? Please enter an 'other' value for this selection.  **\*This question is required.**


































5. What was the hardest thing? **\*This question is required.**



6. What was the most surprising thing you found? **\*This question is required.**







## Appendices

	
<p>7. What was your favorite part of the project? <b>*This question is required.</b></p> 	   
<p>8. How did you feel about a 'blank page' and few instructions at the beginning of the project? <b>*This question is required.</b></p> 	   
<p>9. What does being creative mean to you? <b>*This question is required.</b></p> 	   
<p>10. Do you believe you developed creative skills during the project ? <b>*This question is required.</b></p> <ul style="list-style-type: none"><li><input type="checkbox"/> No</li><li><input type="checkbox"/> Yes</li><li><input type="checkbox"/> Can you tell me more? Please enter an 'other' value for this selection. <input type="text"/> <b>*This question is required.</b></li></ul>	   
<p>11. What does playful mean to you in your own words? <b>*This question is required.</b></p> 	    
<p>12. Were you satisfied with the playful learning aspect of this project? <b>*This question is required.</b></p> <ul style="list-style-type: none"><li><input type="checkbox"/> Very dissatisfied</li><li><input type="checkbox"/> Dissatisfied</li><li><input type="checkbox"/> Neutral</li><li><input type="checkbox"/> Satisfied</li><li><input type="checkbox"/> Very Satisfied</li><li><input type="checkbox"/> Can you tell me more? Please enter an 'other' value for this selection. <input type="text"/> <b>*This question is required.</b></li></ul>	   

Microso





## Appendices

13. How did you feel about **sharing your thoughts and work progress** in group discussions? **\*This question is required.**





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14. How did you feel about **sharing your work publicly**? **\*This question is required.**





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15. Can you name **one thing** that engaged you (even in a small way) with your place? **\*This question is required.**





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16. Do you think if we had used computers/iPad/cell phones to make your pieces **might your personal experience may have been different**? **\*This question is required.**


  
  
  



---

17. If you could **change one thing** for any future projects with teenagers what would it be? **\*This question is required.**



  
  
  


Question More ▾

 Add Page

  
More ▾

**Thank You Page: Thank you! I really enjoyed working with you all.  
Thanks again for your participation in the project, have a great summer!**

 Responses are marked as complete when they reach this page (The survey will end on this page) 

## Appendices

### *Appendix I Teacher Interview Transcript Excerpt*

**Me: Thank you for agreeing to this interview. May I begin by asking you briefly about your primary school?**

T1 Well it's a senior school, it's a co-ed, it was a DEIS school but we lost our DEIS status about two years ago, very transient student population, am...very international amount students in the school, I think we've 60 different nationalities attending the school at the minute, we've 6 streams of 3<sup>rd</sup> to 6<sup>th</sup>.... there's 24 class teachers and I think we've am 12 learning support, it's a new school, a new building, am.... a very young staff, very energetic staff catering to very different needs among the children, quite disadvantaged.

**Me: What about yourself? How many years have you been teaching?**

T1 I've been teaching 26 years, I'm admitting that [laughs], I'm in 5<sup>th</sup> class. I've taught all the classes right up from infants, I was in learning support for a while and I was a resource teacher for a while and I'm assistant principal and that's it. I suppose I've been in 5<sup>th</sup> class for two years, we move around quite a bit so you're very rarely in the same class for more than 3 years.

**Me: Great, thank you. So, to what extent is your day timetabled or organised?**

T1 It's very timetabled, do you want me to go through the timetable?

**Me: Well, let's say just an example...or have you complete independence regarding your daily/weekly timetable?**

T1 No, no, no cos there are certain hours allotted in the curriculum for different subjects that have to be done so Irish, English and Maths are timetabled in our school, every teacher does them at the same time, I think its 4.5 hours for Irish, 4 hours for English at least and 4 hours for Maths. and they have to be done every day

**Me: Have you extra time to play around within your weekly schedule?**

T1: Well we used to have, it was called teacher discretion time but that's kind of gone now as the curriculum is so overloaded so teacher discretion time is gone.

**Me: Really? So you can't choose to select something extra?**

T1: Outside the curriculum?

**Me: Yes**

T1: Well if things happen in the school obviously the whole thing is altered but there's very little time to play around with

**Me: So in relation to the SESE Curriculum (Social, Environmental, Scientific Education) –. Can you just explain briefly about it?**

It's the umbrella really for History, Science, and Geography. It's given 3 hours a week, there's more autonomy there as it does say in the revised curriculum, I'm nearly certain it does that there's more autonomy to the teacher, so say for example you were covering....well you're supposed to do 3 hours a week and its divided into an hour for history, hour for geography and hour for science but it does say in the revised curriculum if you were doing a big project in science you might do science for 2 weeks and then you would make up the history and geography, so you've a bit more flexibility within that area.

**Me: Do you go by the guidelines? If it says 3 hours do you stick to that?**

T1 Well you have to be seen to do it, you have to hand your timetable to the principal, you have to have on your timetable an hour given to history, hour given to geography and hour given to science on your weekly timetable..... now that is done..... and all the other subjects are timetabled like the arts programme, that's 3 hours as well, that's for art, drama and music and then you've religion is timetabled in most schools for half an hour a week so that has to be in your timetable but in saying that that's your timetable and you have to write your timetable..... there is the flexibility within the SESE programme to say do 3 hours of history maybe one week if they were all working on a project or something and then you would make up the science the following week and you wouldn't do history but it is timetabled and the timetables have to be handed up so..... every teacher would have it

**Me: And would the principal go through those?**

T1 Yes, and he'll ask you for it, it's the one thing he will ask you for

**Me: So you have to have this done in advance?**

T1 Yeah

**Me: But it's flexible.....**

T1: Well yeah it does say in the revised curriculum that you can do that yourself, the autonomy... but you have to allow the time for it you know and SPHE and all the rest of them

**Me: So, how do you go about planning lessons for say the History Section?**

T1 Well, before the school year? Are you talking about your yearly scheme or?

**Me: I didn't know you did a yearly scheme**

## Appendices

T1: We do a yearly scheme together, all the 5<sup>th</sup> class teachers so there's no overlap, so the 3<sup>rd</sup> class, the 4<sup>th</sup> class, 5<sup>th</sup> and 6<sup>th</sup> class do all their yearly plans together

**Me: So, how would you normally explore the content for history class or where would you draw your resources from for use in the class**

T1: Well, you see history is divided into three kind of sections, supposedly... and I'm saying that now [laughs].. there's the local.... I think is about 30% of your history programme I'm not 100% sure of that, I might have to clarify that, 40% is kinda national you know Irish history and is and there is international history, so it's kind of broken up for you, because we cover certain things in 5<sup>th</sup> class and other things are covered in 6<sup>th</sup> class so there's no overlap. I think before the revised curriculum, I do remember you went on a time scale, 3<sup>rd</sup> class did early history and you moved up through the decades but not anymore because its like patchwork so like in 5<sup>th</sup> class we do the Aztecs but we also do World War One, you know it's kind of snapshots of history and what you do then is you have a timeline in your room so the kids realise where in history it is, but it's not as prescriptive as before, but we do plan, you have to plan so there's no overlap cos there's no point in kids doing a project on the famine in 3<sup>rd</sup> and going to 6<sup>th</sup> and doing the same thing.

**Me: So is there continuity over choice between the teachers in 5<sup>th</sup> & 6<sup>th</sup> class?**

T1: Oh yeah, so you know what their coming from and what you're going to do and what they are going to do in 6<sup>th</sup>

**Me: Would lesson plans include activities?**

T1: Yes, always

**Me : what type of activities would you plan for, i.e. would they be individual projects, or group work or?**

T1: Well, they'd be a bit of everything...really...there would be group work, there'd be projects, individual work and peer work , your activities could often in history be integrated with drama, could be English or could be art, so when you plan your lesson you look at your objectives, then the content and then the activity. They are the three steps in planning your lessons, the objectives what you want them to learn, then the content and how you are going to deliver that, and then the activity, so there is an activity at the end of it.

**Me: Would there be encouragement for collaborative activities?**

T1: Oh yeah..... yeah there's a huge emphasis on that now...yeah, and there's very little of the old traditional thing of writing out essays on history or writing paragraphs on Daniel O'Connell, very little of that now.

**Me: One of the choices in the History Strand, *Life, Society, Work & Culture in the Past* in the SESE curriculum has a good few units to choose from within the strand like *Life in Norman Ireland* or *Ancient societies* etc. How do you determine which units to select?**

T1: Well you'd have to do it in the school, we'd select it together when we're doing the scheme of work in history, we'd say what do you think is appropriate in 5<sup>th</sup>, what resources are appropriate, do we have any resources for it, and then that would be picked for 5<sup>th</sup>, it's all in the whole school planning. So, once it's planned, that's the way we work.

**Me: So, it wouldn't be down to your personal choice?**

T1: Not really, no...not in a big school, of course if you were the only 5<sup>th</sup> class teacher in a school it is your personal choice but because I'm in a school where there are six 5<sup>th</sup> classes, we have to work as a team.

**Me: So it could be a personal choice in a smaller school...**

T1: I'd imagine it would be...

**Me: So there could be a bias there then...**

T1: Of course, yeah , yeah....the only good thing about that is if the teacher loves what she's teaching she's going to teach it better so the bias could work in your favour

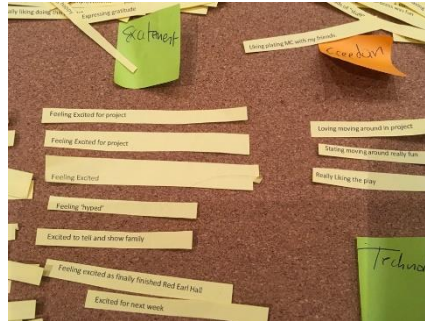
**Me: Overall, what has been your experience with SESE History programme? In your opinion, is there room for improvement?**

T1: I think there's huge amounts of resources for the national and the international aspect of history but I think the local one is completely ignored but like... you know..... something has to be done....it's all over the curriculum.... local history and ...you know....make children historians and all this but if you don't know the local history and there's no facility to go and learn it ....unless.....maybe the way to do it....I don't know but I'm only thinking is.....i heard people saying before that if even a cluster of schools kind of...sent teachers maybe for the EPV days, you know the 5 days course and they did local history and then it could be brought back to the schools and included. You see, an awful lot of our teachers aren't from the [Location1] area where I work so we don't know.....and we're not worse off cos at least when you're in [City1] you can go to all the places in [City1] but certainly the local history is ignored but I think there needs to be some sort of concerted effort..... that it's alright saying there's resources here and resources there, you need to get the content and then decide how you are going to teach it.

## Appendices

### Appendix J DC1 Manual Coding

In the process of learning coding and become comfortable with the process, I found it useful to manually cut up codes and theme them into provisional categories (S1.1).



### Appendix K DC1 M1.2 Excel Coding –Holistic coding into provisional categories

Holistic Codes	Initial Groupings		
No complaints	No complaints	Good learning	Discovering & Selecting objects
Good learning	"Fantastic"	enjoying learning	Discovering & Researching objects
Exciting	happy face (satisfaction)	Positive Learning	Enjoying object-based learning
Discovering & Selecting objects	Content [as in happy]		Discovery
Enjoyment			
Discovering and Researching Objects			
Fun	Flow or "Time Flew"	Fun Making videos	"Best Camp Ever"
	"Time flew"	Fun Making comics	"Glad I signed Up"
Fun Making videos	Pride	Fun using technology	Inspiration [ Environment]
Flow or "Time flew"	Engagement	Fun	Environment/Experience
Fun using technology		Tiring fun	
"Best Camp Ever"		Fun	
Interesting		"Best Camp ever" could go here too	
"Time Flew"	Critical thinking	Enjoyment	
Fun making comics	Interesting	Enjoying	
	Critical Thinking	Enjoying the games	
"Glad I signed up"		Exciting	
"Fantastic"	Ups and downs	Enjoying object-based learning	
Inspiration	UPS AND DOWNS	Enjoyment	
Ups and downs			
Pride			
Enjoying			
enjoying learning			
Enjoying object-based learning			
Enjoying the games			
critical thinking			
happy face (satisfaction)			
Narrative			
Tiring fun			

Appendix L FRAMES Analysis Methodology

FRAMES	Statement															
Session	Week Five 6 <sup>th</sup> April 2019															
Pattern Codes	<b>Searching for a way through the Fog' &amp; Engagement with the Arts can deepen of understanding of place</b>															
Focal sentence	<b>Statement of the Pattern Codes:</b> There is ongoing confusion with what place is and what it means. In the participants development of making meaning, place means people. The ongoing process of making their art pieces, the engagement with the Arts is helpful in defining and interpreting and understanding place.															
Rich Thick description	Today was the 3 <sup>rd</sup> session of 'making' and creating their pieces. During these three weeks participants were engaged in a process of creating to explore and express their understanding of place. Options to 'create' were entirely up to the participants and their choices included art (painting), poetry, narrative origami, collage. The atmosphere was designed to be playful, to foster creativity and engagement with place.															
Analysis	<p>Categories were brought to themes as per the following table:</p> <table border="1"> <thead> <tr> <th>Questionnaire 1<sup>st</sup> cycle</th> <th>Questionnaire 2<sup>nd</sup> cycle</th> <th>Transcriptions 1st cycle</th> <th>Transcription 2<sup>nd</sup> cycle</th> <th>Together</th> </tr> </thead> <tbody> <tr> <td>Place interactions* –  Place as People  Identity  Process/Making  Peers</td> <td>Place Meaning Making People Identity  Process/Making Peer Learning</td> <td>Place engagement  Place means People  Engaging with the Art work  Peer learning</td> <td>Making Meaning of place: People, Being  Peer learning Connecting through the Art work</td> <td>Place Meaning Making People Identity Being  Connecting to place through Art Peer Learning</td> </tr> <tr> <td>*Interactions were two pieces of datum, one each could go to identity and People</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <p><b>Theme 1 – Place Meaning Making : People, Identity, Being</b></p> <p>There is ongoing confusion on what makes place meaningful to people. Findings relate to three sub themes of People, Identity and 'Being'. 'Being' emerged from one participant's interpretation of her place as where she can find calm, e.g. her drawing includes a fish pond.</p> <p><i>"I just thought of things like that calm me down"</i></p> <p>Place as Identity is strongly related to participant's worldviews <i>I would say that I engaged with place based on how I see the world</i>, one participant feels uncomfortable in 'places of no significance' unless known people there. One participant stated:</p> <p><i>"I had a hard time translating the place ... so I focused on all the people that make my place that I'm in so I decided to write all the people that are important to me"</i></p> <p>There is a confusion and no clarity about the meaning of place and place is firmly in the teenager's perspective about their identities and the people in their lives. Physical location is not important: <i>At first I was just kinda thinking of like what San Francisco is as a city, but a lot of that isn't necessarily important to me ((laughs)) just because I mean like even though I live in San Francisco..... I don't think its....I can have this same experience like somewhere else</i> Participants are in a fog but progressing through.</p>	Questionnaire 1 <sup>st</sup> cycle	Questionnaire 2 <sup>nd</sup> cycle	Transcriptions 1st cycle	Transcription 2 <sup>nd</sup> cycle	Together	Place interactions* –  Place as People  Identity  Process/Making  Peers	Place Meaning Making People Identity  Process/Making Peer Learning	Place engagement  Place means People  Engaging with the Art work  Peer learning	Making Meaning of place: People, Being  Peer learning Connecting through the Art work	Place Meaning Making People Identity Being  Connecting to place through Art Peer Learning	*Interactions were two pieces of datum, one each could go to identity and People				
Questionnaire 1 <sup>st</sup> cycle	Questionnaire 2 <sup>nd</sup> cycle	Transcriptions 1st cycle	Transcription 2 <sup>nd</sup> cycle	Together												
Place interactions* –  Place as People  Identity  Process/Making  Peers	Place Meaning Making People Identity  Process/Making Peer Learning	Place engagement  Place means People  Engaging with the Art work  Peer learning	Making Meaning of place: People, Being  Peer learning Connecting through the Art work	Place Meaning Making People Identity Being  Connecting to place through Art Peer Learning												
*Interactions were two pieces of datum, one each could go to identity and People																

## Appendices

	<p><b>Theme 2 Connecting to Place through making Art</b></p> <p>In looking for a pattern, connections to place were made through making Art. Sharing each others ideas and processes encouraged others and opened up discussion as well as helping understand the concept of place.</p> <p><i>What I was realizing was that while all of my connections had a place that created the relationship that place is not what I remember when thinking of them. Place seems incidental in what makes me feel at home</i></p> <p>As the back chat in the session today was of school and getting into college it may have influenced the direction of one participant:  <i>I didn't originally plan on coloring in the MUNI* gold, but other rethinking, I decided it would be a good idea. It represents how we can/have the ability to move from place to place not only can we physically leave our neighborhood but we can also leave our place in ((unreadable)). Because I take the Muni to school, the gold represents how gaining an education can help people leave/change their social economic status</i>          *public bus service</p> <p><b>Theme 1 – Peer learning</b></p> <p>Sharing each others work was an important part of the engagement process. Leading to new understandings one participant stated  <i>Seeing other peoples final projects helped me see the different ways people define and interpret place</i>          New thinking was evident in another participants statement:  <i>Hearing from others and what they consider their place, I found interesting how we could be so different and yet all so similar as well</i></p>
<p><b>Meaning Discussion</b></p>	<p>It is the people participants interact with in a place that matters, making meaning with people is their key to engagement with place.          Education is valued and it is believe educations is good to change social and economic status.          Learning from others is valued and it is believed to help in understanding the concept of place</p>
<p><b>Assertion</b></p>	<p>People matter in the concept of place. Physical location matters only if it includes people. Identity is intertwined with place. The concept of place is difficult to grasp and art helps with the meaning making process.</p>



Appendix M DC3 Analytic Memo Writing

DC3 - Analytic Memo Sample on Coding

I feel like I never thought about how important my physical location is in all the friends I have. I am very grateful that I have grown up in a place like San Francisco where I have 2.000people in ,y high school and had the opportunity to work at the Exploratorium , these places are where

I'm trying Descriptive coding at the moment on the first part of this cycle and Saldana describes it as a noun, (so a person place or thing) and a description of what's there rather than summarising the content. Example here, I think this is more a feeling rather than using a noun, to me it's a realisation once they thought about things, they realised what they had and are grateful, so I would put down 'Realisation of Self', what I need to look at is whether it should be under Holistic Coding which I think is the overall interpretation of the data, after reading Saldana (p. 90) I think the descriptive code here I think would be 'Physical Location'

In this example I also looked at Value coding because it has three constructs, Value, Attitude and Belief and Saldana says it is good for cultural values and identity and because of the context of this intervention which went towards identity this might be appropriate for this cycle. The 3 constructs can then be woven together. Also Saldana says "Phrases such as "It's important that," "I like," "I love," or "I need" alert you to what may be valued, believed, thought, or felt, along with such obvious cluing phrases as "I think," "I feel," and "I want." Participant observation in natural social settings relies more on researcher inferences of values, attitudes, and beliefs. But sometimes the most direct way to find out what someone values, thinks, feels, and believes is to simply ask him or her, "What do you value?", "What's important to you?", "What matters to you most?", "What do you think and feel about ...?"(p. 112) " Saldana also states that be aware of the participants personal and unique experiences, institutions, school, religion, material possessions, etc. as their values beliefs and attitudes and self-constructed identities, the data will reflect their background (p. 113). Also the researcher's values attitudes and beliefs come into play (p. 114) so to be careful and question what I assume from the data "Values Coding is values laden" (p. 114)

so what I came up with for the same piece of code above is

V: sudden realisation of physical locations and their influences on own relationships

A: Grateful for living in this place, museum and school

V: Friendship

## Appendices

### Appendix N Code Book –DC1

Code:	Includes	Example
Fun	"Enjoyment, amusement, or light hearted pleasure" (Oxford dictionary)	"Today I had fun cause we got to build markets and it was fun and when I built a farm it was fun I had fun overall"  "I enjoyed today it was very fun I <u>cant</u> wait until next week this was so much fun"
Minecraft	References to Minecraft, to building 'stuff', to making their areas for the movie – this can be split later to differentiating between Minecraft itself and making	"We got to play on minecraft and we created history"  "It was instering and fun I love bulting in Minecraft and earl hall is a new challenged for me"
History	learning History or displaying an interest in history	"Today was very fun we got to show our projects. I really like history on technology it was very fun"  "I like doing it cos is good cos u can learn more about history and what happen in Galway"
Amazement	Wow, wonder, awe,	"I am amazed by the history of our people. we found out what they wore who they traded with"
Learning	References to learning in general, apart from history Learning	"I think this is fun because we are going to <u>lean</u> new things and after we are going to buildet on Minecraft. I liked because I like learning new things."  "Mediaval Galway. We learned about our countys past today and I have learned a lot and <u>its</u> only the first week (its true). I thought we could do all the designs in Minecraft but turns out you can't because there all difficult to do"
Excitement	"A feeling of great enthusiasm and eagerness" (Oxford dictionary)	"I am excited for this project. I am also excited to learn new things"  "I enjoyed the tour around Galway. I have been to places like them but never understood what they really mean. I found it very interesting and I cant wait when im in town so I can show my family. I really thank Sally for taking us on that tour"
Enjoyment/Liking /Interest	Saying they enjoyed or liked doing something. Saying or doing something that shows they are interested, like pondering their work, adding detail to previous work, listening to others and doing something productive after, being inspired, planning ahead, observing, paying attention, an Exclamation mark after a YES! Emoji happy faces.	"I reallt enjoyed the town of Medieval Ireland. I like the Spanish Arch, Lynnches castle, the outer wall and much more. If I was to rate today I would rate it 10"  "I really enjoyed playing Minecraft with my team members and I liked discussing about what we wanted to do"
Technology	References to physical tools such as 'ipads', computers etc. challenges with technical aspects,	"Today in class with sally we were building medieval places and I liked cos we were playing on iPads and we build house lynch castle and shop so I really liked."  "I feel like good doing history on iPads and is good learning more about what happened and I really like it"  "I thought that it was extremely fun because one I love Minecraft 2 I like building. The only problem was lag"
School Class Time	References to being in class in school, to the time allocated for history	"Today in class was very fun because we showed our projects"  "Today I enjoyed the class I can wait for next week"

*Appendix O Transcriptions*

*Children's Audio reflections*

These transcriptions included examples of DC2 transcriptions from hand held cameras in Museum M2.6 and S2.5 are followed by examples from focus groups.

***Museum Examples –DC2 M2.6 (Sample)***

On the morning of Day 3 small handheld cameras were given to the children to record their audio reflections about the workshop. They could use video or audio which ever they preferred. They went outside the Education room and around the Museum to record the following which are in no particular order:

**NO. 1 ((6th class team, H. and C.))**

[00:00:01] H: Our favourite artefacts are the mace..the great mace and the civic sword because..wel::l we just really like them and ((getting animated and quick))↑↑ we also love the bomb ((laughs))

[00:00:14] H: mm I think our favourite activities we found the stories and the comics... that was really good fun

[00:00:20] C: yeah we also learned an awful lot from the artefacts which inspired us a lot for making stories and comics

[00:00:29] H: I liked it that we were allowed to just.. go all out and do what we ↑wan:ted for the stories they didn't have to be a certain wa::y... apart from just containing the objects which was fun I also liked that we could choose our own ↑objects

[00:00:42] C: yeah I liked that as well and our favourite part of the civic sword and the great mace is the patterns especially the rose pattern... cos our favourite....cos well we like roses..I don't know why

[00:00:54] ((H. Laughs laughs))

[00:00:54] C: it's unexplainable....@Ye::ah

[00:00:58] H: I like that we got to work in groups our own a::ge so we could actually find who we could relate to

[00:01:04] H: Mmm...is there anything else?

[00:01:06] C: Ahm

[00:01:07] (0.3)

[00:01:10] C: Oh the..the head

[00:01:12] H: Oh yeah for some reason we kinda liked looking at St. Ursula's ↑skull am.. it's just quite interesting view of history and we really ↑enjoyed this

[00:01:24] C: so

[00:01:25] H: ↑yeah

[00:01:25]C: thank you for listening

**No. 8 ((5th class boys J. and C.))**

[00:00:04] J: how was the camp what did you like about it ((both laughing))

[00:00:18] J: What did you like

[00:00:21] C: am don't know

[00:00:25] C: it was a good camp-

[00:00:26] J: so far=

[00:00:27] C:=so far

[00:00:32] J: but what did you like about it

[00:00:36] C: the iPads [00:00:39] the iPads [00:00:42] and the iPads

[00:00:44] J: Ok lets go back to the head quarters

[00:00:48] END

**No. 14 ((5th class S. and K.))**

[00:00:01] We enjoyed that am there was no really rules-

## Appendices

[00:00:06] and it wasn't too intense like we got to like play as well  
[00:00:10] yeah and that sort of encouraged us to learn more  
[00:00:14] yeah  
[00:00:16] it was enj..it was really fun

### **No. 16 ((5th class S. and K.))**

[00:00:01] [Both together]We hope to come back next year because we really really really really really really really really  
really ↑really enjoyed it  
[00:00:09] ↑Thank you

### **No. 18 ((5th class S. and K.))**

[00:00:00] We enjoyed that we got to have freedom  
[00:00:04] and we got to ( ) were treated like adults  
[00:00:11] and we got coffee  
[00:00:14] END

### **No. 19 ((5th class S. and K.))**

[00:00:01] we probably got to learn whenever we wanted and we could like take breaks...and we could decide...  
what we wanted to do and when we wanted to do it  
[00:00:11] END

### **No. 20 ((6th class S. and E.))**

((soft spoken throughout))

[00:00:04] Hello  
[00:00:13] S: Yesterday was a ↑really fun day  
[00:00:20] S: the comics well really good I think we did ok in them ..it was really good how. (0.1) you just let us do our own thing and make up our own thing  
[00:00:32] S: also with the filming.. really really really liked the freedom we were given in it and also the fact that you didn't mind us being a little bit late... and yes E. I know I'm supposed to speak louder but

### **No. 21 ((6th class S. and E.))**

[00:00:03] E: Hi so this is my thoughts on yesterday Thursday the 13th of July of the digital course. second day of the digital course. I ↑thought it was brilliant better than Monday if that is even possible I just ↑loved doing the comics and I just ↑loved even more doing the movie and I'm so excited today to contin:ue and fix the mistakes that we made yesterday. ↑Thank you  
[00:00:40] END

### *Field Trip – School Examples DC2 S2.5 (Sample)*

Present: Sally, Two research assistants, teacher and pupils.

Context: Early 14th Century Dominican Priory/Abbey Field trip.  
((Transcription video 15.43))

[00:00:00] Research Assistant starts videoing  
((Girls are walking into the Abbey and walking around the grave slabs))  
[00:00:18] Sally: We'll just wait until we get everyone up  
[00:00:41] ((then I start showing them the talc trick at the medieval slab as transcribed on the other video))  
[00:03:58] ((girls walking around the slabstones))  
((Mary is rubbing the grave with the talc and the girls are looking on))  
[00:04:25] A: !YES !YES we got writing  
A: Sorry I got excited  
[00:04:32] !Oh my God  
[00:04:37] I think we need to learn Latin now  
Teacher: There you go  
Sally: Some of them just have lovely designs on them and if you ever go to look up any books you'll see those pictures on them  
[00:04:50] ((girls are still rubbing the slabs))

## Appendices

[00:04:53] Child?: oh look (Pointing to some writing appearing)  
(( words come up, teacher tells them to go find ones with designs on them, [00:05:16] they all disperse around the abbey))

[00:05:34] (( they crowd around one slab, but no design so one girl says ;this one looks like it has a design' but none when done. another says 'do this one' [00:05:49] 'one here' and another says' [00:05:51] 'one down there and it has loads of designs on it' ' so they disperse. R. [00:06:04] stays and sits by slab and says she is going to write it down (the inscription))

[00:06:07] R: I'm going to write it down  
(( [00:06:14] 2 girls stay and take a picture with their iPads))

[00:06:17] R is writing the inscription [00:06:41]

[00:06:53] Sally and Damhnait come to where R. is. Damhnait tries to read it. Sally says 'look at the designs on that' and points to next slab

[00:06:54] ((R and Damhnait try to read the slab together mark out a K B R and have conversation about the name [00:07:44] R comments she thought it was Latin and she couldn't read it

[00:08:01] R: guys, we need more talcum powder over here, we can read it. A2 ((calls A2 and runs to get girls))  
!OMG heard in background ((not related to R.))  
((5/6 girls come down with R. but go to a different slab. R. calls A2 over as A2 has the talc, A2 comes over))

[00:08:37] R: ((reads and runs her hands over the words as she reads)) Pray for the soul of William

[00:08:44] ((A2 pours the talc over the slab)) (R. starts rubbing the talc into the slab with her hand))

R: Ok pray for the soul of ((and points to words as she reads))

[00:09:12] Reads it aloud again. Some other girls come and help with the reading  
Child?: the soul of William and his wife Annie  
((R. and W. still rubbing))  
Child?: Anne, her name is Anne  
((still trying to read))

[00:10:17] R: so hard to read.  
((Sally comes along))

[00:10:17] R: Sally we figured out what most of it says

[00:10:19] Sally: Oh brilliant  
((W. and R. read out the inscription together))

Teacher comes down: The two above are after having a revelation they found the Berminghams grave. I said Sally said that already you know... you weren't listening ((Sally Laughs)) [00:10:44]

R. can be heard reading inscription to the teacher [00:10:57]  
((at the next slab beside it some other girls are rubbing the talc in. sally tells them they don't need much talc))

Damhnait: Sally we wanted to show you this one ((everyone there turns to one Damhnait mentioned, these 3 slabs were in a row))  
((Meanwhile F. who is filming goes up from the West to the East of the Abbey [00:11:16] to another group of girls doing another grave and who are reading aloud the inscription))

Child?: Pray for the soul of the ( ) who died September 77 age as years squiggly line

[00:11:54] Sally: Did ye see the monkey down there  
((Sally reminds them to take their pictures))

[00:12:03] where's the monkey  
((some girls go running back to the west side to see the monkey))

[00:12:25] A: ((calling for IPad)).  
A: IPad, IPad. we got all of that reading down there (( to Fiona))  
F: what was it

[00:12:31] A: It was about the lady Margareta and the Lady Maltilda

[00:12:35] Child?: And we got all that..[I climbed up ]((holding sticky notes where they wrote it down))  
A: ((reading the notes)) [Lady de Bermingham] fourth daughter of Thomas-

F: -Which one is the de Bermingham grave

[00:12:41] A: There that one ((points)) and here this one

[00:12:43] ((A. points to De Burgh tomb))  
A: This is de Burgh we read all if that ( ) I'd say ((walking over to de Burgh tomb))  
A: ((feeling the tomb)) I'd say this is de Burgh himself ((reading the tombstone with two other girls))

[00:12:57] Oh look we got some English ((pointing at a wall plaque))  
Child?: Lots of ↑English

## Appendices

[00:13:00] A: ((Reading and pointing at the words as she reads)) Ok::ay Here is body of Sir John...here squat down squat down ((girl bends over and A. uses her back as a support to write on)) Ah I need more labels  
[00:13:13] Child A2: ((A2 is bent over but is quite excited)) Who has the labels who has sticky notes ((Looks at F.))  
F.: Sally?  
[00:13:28] A: Body of Sir John.. oh genie  
Child: Does anybody have sticky notes  
[00:13:33] A: ↑Oh my daddys name is J. and my mom's maiden name is B.  
((few girls around now trying to read the plaque))  
Deceased  
Deceased (Pronouncing diseased)) in the 36 years 1666 this tomb was erected  
Wait  
((all reading together different words))  
Age  
His age  
1666 this tomb was erected...Rosie I'm doing this this was erected for him ((A. is writing on a sticky on A.'s back))  
and his poster  
his widow the Lady Mary Bermingham  
[00:15:10] R.: ((finishes of the reading)) the Baroness of [...] in 1683..seriously guys  
[00:15:16] A. : his widow the Lady [Named here]  
[00:15:23] A2:; now Baroness of [...] in 1688  
[00:15:27] A: Oh my God that's crazy my granny's name is [Named here] and she used to live in [Town 2]..  
genie maces  
[00:15:34] A: Anyway [Named here]  
[00:15:38] A2: ((laughing)) I'd prefer if you didn't write the rest ( )  
[00:15:41] A: [Named here]...Ok I'll write the rest on the wall  
[00:15:42] END

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### *DC2 Focus Group No.1– S2.5 (Sample)*

**Thursday 8<sup>th</sup> June 2017**

**Held in 5<sup>th</sup> Classroom (room at back).**

**Present: Sally and seven children**

**Asked for their permission to record and explained why.**

School visit: 29<sup>th</sup>/30<sup>th</sup> (Mon Tues) May –Focus group 9 days later (Thursday)

Audio switched off at 29.27 minutes

[START 00:00]

[00:03:04] MODERATOR: that's good...I suppose the other thing was you know was it too hard? The who::le thing

[00:03:11] ((Few mumblings of no))

[00:03:12] MODERATOR: no?

[00:03:12] Child 1: I don't think it was too hard. Thinking of what you are doing in the time limit is kind of like we were rushing to do the whole thing together in the time

Child?: ( )

[00:03:26] Child 1: we were really far behind everything else

[00:03:28] MODERATOR: I suppose maybe some people said it was kind of hard but I suppose a lot of what the hard things was really was putting the ideas together, the ideas were hard and how to reach agreement on ideas

[00:03:40] (few yeahs)

[00:03:41] Child?: Yeah that was hard to try to agree on something

[00:03:44] Moderator: yeah so how did ye=

[00:03:45] child?:= (crazy) for (art) cos then you were like basing on kinda like something

## Appendices

[00:03:49] Moderator: Oh, ok, yeah that's what we were just saying the themes were kind of similar so that kind of helped

[00:03:54] ours was really easy ( ) everything because we mixed them all together

[00:04:00] yeah

[00:04:00] Yeah that's what we ( )

[00:04:02] we kind of changed ours a teeny bit, still with the ideas

[00:04:05] MODERATOR: and how did ye come to an agreement with your story, you know the way everyone kind of said their story for a minute to everyone else

[00:04:11] yeah

[00:04:12] yeah

[00:04:11] Moderator: was that a good way or not a good way what do ye think of that?

[00:04:16] [good way cos then you understand what they story is about]

[00:04:16] (inaudible)

[00:04:16] [because... yeah]... let's say..if you gave just the sheet to another person to read well they wouldn't really understand what the story was about because they are just reading it you actually have to say it out of them

[00:04:28] Moderator: yeah yeah you had to say it out to them, but I wonder then when ye all said your ideas to the other team members when ye went then to decide a group theme, a group story how was that, that obviously was the hard part I think?

[00:04:42] Well

[00:04:42] No, that was the easy part for our group

[00:04:43] Moderator: Was it? ↑, was it? ↑

[00:04:44] cos I already knew there two stories so we already

[00:04:49] Moderator: so ye had kind of=

[00:04:51] Child?: =already had an idea what to do and we all had the same kind of idea

[00:04:55] Moderator: that was great, that was great, but let's say that was brilliant but for teams that didn't let's say you had a different idea and you had a different idea and you had a different idea, 3 different complete ideas how (stress this) did ye come together

[00:05:07] we merged ours together kind of

[00:05:07] Am

[00:05:10] Yeah

[00:05:10] Yeah

[00:05:09] Child 2: I had to (close my eyes) together but the first two stories they got put together first and then it was my story was written but like the Dominican Priory

[00:05:22] Moderator: [yeah]

[00:05:22] Child 2: [and] then they did the other story so it was like one totally completely different story and then the one we had actually planned to do

MODERATOR: Oh ok, so ye got two stories out of it so

[00:05:49] Child?: And mine was about this lady and about the Dominican priory was a ghost and she told the story of a battle and then my friends one was quite the same yeah so that's how we got together=

[00:06:01] =and we all had kinda had the same idea and there's one story that had like a @bird in it like a rare bird and @got killed ((laughs))

[00:06:12] and ye had the birds here last week

[00:06:15] @ye('hhh)ah

[00:06:18] MODERATOR: so that might cause problems in teams if people have different ideas and maybe their ideas aren't being included or whatever how would...did that happen in teams

[00:06:32] (few no's)

END [00:27:56]

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### *DC2 Focus Group No. 2 –S2.5 (Sample)*

Thursday 8<sup>th</sup> June 2017 - Held in 5<sup>th</sup> Classroom (room at back). School visit: 29<sup>th</sup>/30<sup>th</sup> (Mon Tues) May – Focus Group- 9 days later (Thursday)

Present: Sally and 5 children

Asked children for their permission to record and explained why.

## Appendices

Length of recording: 23.28

START 00:00

[00:07:00] Moderator: So what did ye think of the sharing as we went along. You know the first time we did sharing and nobody was finished their comic, you were sharing your process as they say, sharing how you're working, or how you're working out your ideas, what do ye think of the sharing?

[00:07:14] Child 2: I liked that cos you could share the ideas with the other people and they kind of said what they were going to do and you were like alright ..like..yeah..((laughs))  
((few laughs))

[00:07:26] MODERATOR: Was there anyone not happy with it? Child 3, how do you feel about sharing?

[00:07:31] Child 3: I liked the sharing

[00:07:31] Moderator: did you

[00:07:32] Child 3: yeah

[00:07:34] Moderator: and what do ye think, did it make anyone anxious or anything?

[00:07:36] Child 2: Yeah

((Few other voices: Yeah))

[00:07:38] Child 2: Kind of with the imovie

[00:07:41] Child ?: Kind of like oh theirs is better like

[00:07:42] A: [ Like Genie what do they think of ours

[00:07:42] Child ?: [we should really start again or something, yeah

((Other voices: yeah))

[00:07:47] MODERATOR: yeah, but I think everyone enjoyed everyones

[00:07:50] Few Voices: Yeah

[00:07:53] Moderator: would you have been anxious before you went up to present your stuff?

[00:07:59] 3 yeahs

[00:07:59] Moderator: How did ye feel after it then?

[00:08:01] Child ? Relief

[00:08:02] Child 2: relief

[00:08:04] Other voices: yeah

[00:08:04] Moderator: Relief...did ye feel a bit of pride or a bit of-

[00:08:06] Child 2: -Joy=

[00:08:07] Moderator: =Joy, Or I did this...

[00:08:09] Child 2: I felt I was very smart after it

[00:08:11] Moderator: I did you child 2 ((laughs))

[00:08:12] Child 2: Yeah, that's good actually that you felt that way.

[00:08:15] yeah

[00:08:16] Moderator: That's one of the things about sharing that it does help you learn and it makes you feel that you're better at learning and then that helps you in the next thing.

[00:08:32] Moderator: I suppose then the overall experience, the whole thing, you had the walk, the tour, you had the writing process and you had the making then the next day. So lets say as an overall experience how was it

[00:08:49] Child ? [Great

[00:08:49] Child ?[It was a lot of fun

[00:08:50] Child ? so[ much fun

[00:08:51] Child ? a [lot of fun

[00:08:52] Child 2@ I didn't think I was into that technology before but now I am...like I've the app Imovie on my phone now ((laughs))

[00:08:59] Moderator: right, right ((laughs)) ok.

[00:09:01] Child ? I wasn't sure if I'd like it or not but I really enjoyed it.

[00:09:04] 2 Yeahs

[END} Turned off recorder at 23.28

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*DC2 Focus Group S2.3 (Sample)*

June 16th 2017

Held in separate empty classroom

Present: Sally and 6 children



## Appendices

Asked children for their permission to record and explained why. Had general chat  
Length of recording: 30.34

[00:08:46] Moderator: The overall experience ye had the tour and then ye did the writing which I know wasn't a favourite either but am then we had the making let's say for the whole day but in terms of the whole experience as it is all together do you think did it give ye an interest in heritage in your place

[00:09:07] yeah

yeah

[00:09:08] P:: Yes definitely

[00:09:09] T: cos you could see once you were out on the moat you could see the ...like..=

[00:09:16] P: =all the town

[00:09:17] T: Yeah [and the (mound)]

[00:09:18] H: [It was fun cos you weren't just staying in a classroom looking at a history book you kinda had somebody tell it to ya and you were like working

[00:09:28] Like in Minecraft.. it was cool cos instead of drawing pictures you were using blocks like and stairs up to the castle

((voices in background, inaudible ))

[00:09:40] J: you know like...the..being on the moat like it was better than sitting looking at a picture of it..you're on it and you can experience what it's actually like-

H: -yeah like [what its like to see around]

[00:09:54] T: [I Like the comic cos once] you put the picture into it it actually went into a different colour and faded into the comic

[00:10:00] MODERATOR: Yeah that's true it looked actually professional

[00:10:06] H: Like when you take pictures you can make it into the video

[00:10:10] P: I love we did something different rather than schoolwork-

[00:10:12] H: -yeah instead of just sitting there looking at a book

[00:10:15] P: It was very interesting to go up the moat and like ... you feel like architects-

[00:10:18] H: yeah you feel like looking around the place

((inaudible voices))

[00:10:21] Minecraft cos you good do what you wanted like looking at pictures of moat like you could change it and do whatever you want

[00:10:28] yea like you don't have to rub it out or start again you just have to delete a block or something

[00:10:35] Moderator: do you think that gave you an interest, Let's say I saw since I was here that some people were up on the moat and dug a hole underneath it

[00:10:40] ((few yeahs))

[00:10:41] yeah they did they were looking for treasure

[00:10:43] MODERATOR: Yeah, how did ye feel [00:10:43] about that then

[00:10:44] Not good

[00:10:46] H: [It wasn't very nice

[00:10:45] P: [Not good at all

[00:10:47] ?: [shouldn't be doing that. Shouldn't be doing that

[00:10:48] ? :I think it was ( P. )

[00:10:50] ((Laughs))

[00:10:46] H: It wasn't very nice because they're building a restaurant and stuff up there and that's not very nice cos tourists might come and that might drive them away

[00:10:56] MODERATOR: Yeah..Did ye feel kinda like this was your moat, your heritage

[00:11:02] ((!yeahs together))

[00:11:04] P: Yes

[00:11:05] (inaudible)

[00:11:07] ?:If there even is treasure we should leave it there [00:11:10]

[00:11:10] [00:11:09] Yeah its not right

((all speaking together so inaudible))

[00:11:12] It might be a curse

[00:11:15] P: they shouldn't have touched it at all

I think the (parents) did it

R: [I was talking to my dad about it and ( ) gone all over Europe like they start in Sweden France] England  
Wales

## Appendices

?:[ (Parents) don't to that that's not nice] I'll tell him  
[00:11:25] MODERATOR: we all like that R. we are all a mixture of everything, so ye kinda felt like that it was yours and somebody-  
[00:11:31] H: -Ruined it kinda  
[00:11:32] ?: !Who did that  
[00:11:34] Moderator: Yeah Yeah, would ye have felt that way always or would the project have given ye a bit more this is mine-  
[00:11:40] yeah  
yeah  
yeah  
[00:11:41] P: yes definitely  
[00:11:42] MODERATOR: You think so  
[00:11:42] P: cos when you explored a bit more you think I don't know this so I don't think this is mine...now you've gone up to it you've looked around-  
[00:11:49] H: -you've heard about the heritage make you feel like-:  
[00:11:52] P: -[oh yeah I know what its about now so its good] ..  
[00:11:52] H: [this is [...] moat and I live (around Town 1)... it's mine]  
[00:11:55] P: I know about this now so I own...you feel like you own it

END

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### *DC2 Focus Group S2.4 (One Page Sample)*

Focus Group held on Friday 27th May 2017

Present: Sally, seven children and Teacher

Time 37.07

Explained to the children about the recording before turned on recorder.

START

[00:00:03]

General Chat: Thanked the children for the project and their journals

Teacher: I'm really interested in knowing what going on. It's great for us to sit down with a group of honest people about it you know...

I thanked them for the project and for their reflection journals.

[00:00:34] C: i liked the... I knew the thing

[00:00:36] Moderator: did you? I'm going to ask ye about all those now. I suppose the first thing the whole thing as a package lets say you had the tour and then we had the whole writing thing and then the next day we had the making and the creating (hhh)-

[00:00:48] child?:There was nothing I didn't not like about it

[00:00:49] Moderator: was there not

[00:00:51] j: [yeah

[00:00:51] C:[ Everything everything was kinda good

[00:00:53] [I found it really good

[00:00:53] [yeah

[00:00:53] child?[I loved it all ((same child as at [00:00:48]))

((inaudible voices together))

[00:00:55] C: !Oh yeah there's this tower where A. lives and its in one of the fields-

[00:01:00] J-That's near where i live. I live close to where A. lives-

[00:01:04] C: -and we climbed it yesterday at A.'s birthday and we went to this old abandoned house and A. said it was called [Named here]?

[00:01:10] Moderator: Oh that's right [Named house]

[00:01:12] [and C....ye did something ((giggles))

[00:01:12] [Town 2] had smallpox or something

[00:01:17] C: I didn't? What did I do?

[00:01:18] J: there was a tyre on the wall

[00:01:19] Moderator: did ye get into the tower

[00:01:20] ( ) Leonard's house

[00:01:22] there was like a bar broken at the gate

## Appendices

[00:01:26] and we were able to climb it  
[00:01:29] but it was so cool  
(voice in background explaining house to someone can here 'up the stairs ('big house'))  
[00:01:30] Moderator: do you think C. you had more interest in the tower let's say-  
[00:01:37] C: i like the view from the top of it  
[00:01:38] yeah  
[00:01:39] yeah  
[00:01:39] It was ama::zing view  
[00:01:39] you could see the whole [of [Town 2]  
[00:01:40] [there's a stairs you can go up and then there was just the top and it had no fences like on it  
[00:01:47] Moderator: yeah that's right...it's great that that's all around for ye-  
[00:01:51] C: you ((rising intonation)) could see the sch::ool  
[00:01:52] :they put a gate there that way people couldn't get through so they forgot a bar so  
[00:01:58] we were able to fit through

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[00:05:04] C:I'm building something at the moment with my friend on the (Xbox)  
[00:05:10] ?:and I'm building it with Lucas  
[00:05:12] we're doing it online  
[00:05:14] Moderator: so are ye building the heritage:  
[00:05:16] yeah  
yeah  
[00:05:16] Moderator: so would that have been a development of what we did then.  
[00:05:18] yeah  
yeah  
Moderator: would that have given ye the interest or not given ye an interest  
[00:05:21] J: yeah  
[00:05:23] ? well kinda already had an interest  
[00:05:25] : this kinda it gave me more of an interest that I'd like to do it more  
[00:05:29] we did this bit with the arch is like there's a piston and then when you like... someone stood up at  
the top when you pulled the (sleeve) water would flow down and when you pulled it again water would stop  
[00:05:41] Teacher: oh very interesting (inaudible voices together))  
[00:05:41] J: you showed that in the shows  
[00:05:44] Moderator: really good

-----00-----

[00:09:15] Moderator: you know when you're saying this is fun or this is exciting what would kind of fun  
be...cos my idea of fun and yours probably be totally different  
[00:09:24]  
[00:09:25] : am...not doing schoolwork  
[00:09:27] Moderator: not doing schoolwork...yeah that came up in my last school actually...that was what  
they meant by fun yeah?[00:09:30]  
(0.3) ((pause)) (( I am conscious of a teacher being in the room))  
[00:09:33] ah..playing with Minecraft was fun  
[00:09:34] Moderator: yeah  
[00:09:36] J; something you can enjoy  
[00:09:39] yeah cos I thought I'd never play Minecraft in school so it was very fun that we got to-  
[00:09:46] I enjoyed the exploring  
[00:09:48] : yeah It was very fun how we got to just roam around  
[00:09:51] J: I got to visit place I thought (( ))  
[00:09:53] [and we weren't really really restricted ...and ...couldn't go  
[00:09:55] child?: yeah we could walk anywhere we wanted say if we were like walking on a footpath [going  
we'd have to walk the street but when we were-  
[00:10:03] -we kinda got to take the pictures yeah [then in different place  
[00:10:05] child?: [in the Abbey we could go around wherever we wanted-

## Appendices

[00:10:06] yeah so we got to take the pictures we wanted

[00:10:11] so ye had the choice is that what ye are saying

((few yeahs))

[00:10:14] J: we weren't restricted

[00:10:15] C: I like the abbey the most

[00:10:18] J: I liked the heritage center the most

[00:10:20] I don't know what I like the most I liked it all

[00:10:21] Teacher: And can I ask you when you're in the..!m not sure what you mean by...like surely if you've gone to the Abbey before that you'd have been able to have a look around before wouldn't you?[00:10:28]

(o.1)

00:10:29] Teacher: Have you ever gone to the Abbey before?

yeah

I've never been inside it

I've never been inside it

me neither

Neither had I

((few voices Inaudible))

[00:10:36] C: I've been to the Abbey once or twice with am in school but we haven't been able to roam around

it

END

Appendix P NVivo

Example of experimentation with NVivo

The top screenshot displays the NVivo 12 Pro interface with the 'Node Tools' window open. The window title is 'Parents survey analysis codin...'. It shows a list of nodes with columns for Name, Files, and Referen. The 'Holistic coding' node is selected, and its details are shown on the right, including a coverage percentage of 9.09% and several references with their respective text excerpts.

Name	Files	Referen
Descriptive Coding	1	16
Descriptive coding (	1	16
Descriptive Coding	1	16
Holistic coding	1	16
Invivo coding	1	16
Invivo Coding (2)	1	16
Invivo coding (3)	1	16
Process Coding	1	16
Survey Any other fe	1	16
Survey Question w	1	16
survey Question Ro	1	16

The bottom screenshot shows the 'Dataset Tools' window with a data table for 'Musueum'. The table has columns for ID, 12 T..., Survey Question, what was Positive, Descriptive Coding, Holistic coding, Process Coding, and Invivo. The table contains three rows of data. To the right of the table is a vertical bar chart showing coding density for various nodes, with 'Holistic coding' having the highest density.

ID	12 T...	Survey Question	what was Positive	Descriptive Coding	Holistic coding	Process Coding	Invivo
1	Count	Response					
2	1	Ben learnt about many different historical objects in the Galway Museum and enjoyed making up stories about these items. He had fun whilst learning interesting facts. He thought Sally McHugh the instructor was full of knowledge, and fun and communicated well with the kids good	learnt about objects enjoyed making up stories had fun learning facts happy with instructor communication with instructor instructor fun instructor good knowledge	Learnt about objects Enjoyed making up stories Fun Instructor had good knowledge Instructor was fun Instructor communicated well	learning about objects enjoying creating stories having fun feeling instructor	"Enjoy in the M up stori whilst le experie	
3	2	His confidence interacting with new people and the interest he showed throughout the week in his project and the museum	gaining confidence interacting with new people Interest showed	Confidence grew meeting new people Showed interest	growing confidence meeting new people	"confide interact new pe "Interesi	

Appendix Q Ethics

Sample Information, Consent and Assent Forms

Letter to Principal



School of Education,  
National University of Ireland,  
Galway.  
Date.

Dear [Principal Name],  
[Principal Address]

I am a PhD researcher at the National University of Ireland, Galway and am based at the School of Education under the supervision of Dr. Tony Hall. I am a mature student with an academic background in Digital Media (M.A.) and a B.A. in Information Technology & Archaeology. I am currently identifying schools that may be interested in participating in my research, called the **TECHe** project (Technology enhanced cultural heritage elearning).

My research will involve 5<sup>th</sup> or 6<sup>th</sup> class pupils in the exploration of constructionist technologies in order to enhance their engagement with local cultural heritage, both in formal (school) and informal (museum, NUIG) environments. The research will build on children's existing knowledge of the SESE 5<sup>th</sup> class History curriculum. The co-creation of curriculum-based heritage elearning resources, which could potentially be used by other schools and students and which will be available on the project website will be the end product of the workshops. However the research is as much about the process and the learning as it is about the finished product. Children will develop technological, collaborative, creative skills as well as develop an understanding and appreciation of local heritage, a sense of their place and perhaps their (new) community.

I have permission from the Galway City Museum to use their educational facilities for the purpose of learning workshops and from the School of Education at NUIG to allow children to use university iPads and computers for editing purposes. Children will work on teams for the duration of the project and create digital artefacts such as film, podcasts, or animations along

with Minecraft, all related to heritage in their area and tied to the current 5<sup>th</sup> and 6<sup>th</sup> class SESE learning objectives.

I propose to offer a 2 hour session every week for ten weeks (at school's discretion and according to timetables) with the children, initially in their own school followed by a session at Galway City Museum and a digital workshop at either their own school or at NUI Galway.

The project website, [www.eheritage.ie](http://www.eheritage.ie), set up for my pilot M.A. experiment, will hold the children's digital creations. Each child can choose an avatar and a pseudonym in order to protect privacy and all digital creations will be private to registered students only. A Logon facility will ensure only those registered can access the site. A social network behind the logon will facilitate collaboration and communication between members.

I would welcome an opportunity to visit you and your 5<sup>th</sup> or 6<sup>th</sup> class teacher to discuss this further and to explain in person the aims and objectives of my research and any possible participation. Thank you for taking the time to read this and please feel free to contact me, without obligation about any questions you may have regarding the proposed project. My supervisor Dr. Tony Hall may also be contacted at [tony.hall@nuigalway.ie](mailto:tony.hall@nuigalway.ie) for further information.

Yours faithfully,

Sally McHugh,  
PhD Candidate,  
School of Education,  
National University of Ireland,  
Galway.  
Phone: t .....  
Email: [s.mchugh1@nuigalway.ie](mailto:s.mchugh1@nuigalway.ie)



**Information Sheet – Parents and Legal Guardians**  
**Project TEChE (Technology enhanced Cultural Heritage ELearning)**

Your child is invited to participate in workshop research which aims to explore local heritage and history by using different technologies, and will be held in both their formal school classroom and the informal setting of the Galway City Museum and National University of Ireland, Galway. This project is developed in partnership with National University of Ireland, Galway and is supervised by Dr Tony Hall (School of Education, National University of Ireland, Galway, [tony.hall@nuigalway.ie](mailto:tony.hall@nuigalway.ie)). Sally McHugh ([s.mchugh1@nuigalway.ie](mailto:s.mchugh1@nuigalway.ie)) is conducting research in the area, mentored by the above advisor.

We wish to seek your permission for your son/daughter to participate on the programme and to use the technology available in a safe and effective manner. Where appropriate, we would also like to publish work they may create during the programme as curriculum based elearning resources which should be of educational benefit to other students and schools.

We also wish to seek permission for your son/daughter to participate in the research part of the programme. Participation in this part of the programme is voluntary and you may remove your son/daughter from the process at any time, for any reason, without penalty and any information already recorded about them will not be used. Should you wish your son/daughter to be omitted from the research part, they can still participate in the programme, but none of their information will be used in the research.

**Research Project Overview**

This research project is exploring how technologies can enhance children's engagement with cultural heritage within a formal classroom setting and an informal setting (museum). The researcher Sally McHugh ([s.mchugh1@nuigalway.ie](mailto:s.mchugh1@nuigalway.ie) / 087-[2511111](tel:087-2511111)), aims to work with children to develop elearning resources based on heritage of childrens' own locality, the current school curriculum and existing academic archaeological/historical material. The duration of the research will be dependent on the participating schools' timetable but will aim to be held over ten weeks for 2 hours per week. Children will be guided in developing resources (e.g.

Researcher: Sally McHugh  
School of Education, National University of Ireland, Galway  
Email: [s.mchugh1@nuigalway.ie](mailto:s.mchugh1@nuigalway.ie)  
Phone: ( )  
Project Website: [www.eheritage.ie](http://www.eheritage.ie)



film, podcasts, animations, minecraft) in a digital workshop. Computers (tablets) will be made available to participating children during the sessions.

### **Workshop Research Procedure**

By agreeing to participate in the workshop research process, your child will be invited to **(1)** complete a questionnaire (one at the beginning of the workshop, and one at end of workshop), **(2)** provide the researcher (Sally McHugh) with permission to observe / photograph their work during the workshops **(3)** provide consent to upload their digital projects to a shared webspace (a Login facility will only allow registered children to participate and avatars and pseudonyms will be used so as not to identify any children individually) **(4)** provide consent for the researcher to use your child's digital projects as possible content for public elearning resources.

### **Benefits**

Your child does not have to participate in the programme, it is entirely voluntary but if they participate, they may withdraw at any time without explanation. All data collected will be held on a shared webspace ([www.eheritage.ie](http://www.eheritage.ie)), where privacy and confidentiality will be ensured by a Logon facility. Any resulting public elearning resources will not individually identify children. Your child will work as part of a team and should benefit from this research project by developing technical, collaborative, problem-solving and creative skills. In the process they will learn about their locality, and the history and heritage associated with their area.

As part of the programme, your [son/daughter] will be using modern technology, which will include access to the internet and use of cameras/iPads. They will be under the supervision and guidance of Ms. McHugh and their class teacher. All activities will comply with best practice in Child Protection and the policies of the school and National University of Ireland, Galway in this area to ensure that students benefit from the learning opportunities offered by technology in a safe and effective manner. Management of photographic images will be strictly in compliance with the above policies. Ms. McHugh has undergone Garda Vetting procedures to receive clearance to work with minors.

All information that is collected by the researchers will be anonymised and stored in accordance with the Data Protection Act at National University of Ireland, Galway. In the unlikely event that information about illegal activities should emerge during the study, the researchers will follow the school's Child Protection policy and inform the relevant authorities. There may be lectures, Ph.D. thesis, conference presentations

Researcher: Sally McHugh  
School of Education, National University of Ireland, Galway  
Email: [s.mchugh1@nuigalway.ie](mailto:s.mchugh1@nuigalway.ie)  
Phone: 0... ..  
Project Website: [www.eheritage.ie](http://www.eheritage.ie)

and peer-reviewed journal articles written as a result of this **TECHe** project, however the students will not be identified.

From time to time, we may also capture photographic images of your son/daughter and their classmates at work – this may be used in communications and promotional material about the **TECHe** project. Use of images will be strictly in accordance with best practice in Child Protection policies and guidelines. Your son/daughter's name will not appear alongside any images. Should you wish your son/daughter to be omitted from promotional material, they can still participate in the programme, but no images of them will be used.

Please sign the attached consent form and return the form to [teacher's name] as soon as possible. If you have any questions in relation to this, please do not hesitate to contact us.

Kind regards,

Sally McHugh (principal investigator) and Dr. Tony Hall (supervisor, School of Education, NUI Galway.)  
(.....) / [s.mchugh1@nuigalway.ie](mailto:s.mchugh1@nuigalway.ie), [tony.hall@nuigalway.ie](mailto:tony.hall@nuigalway.ie)

Researcher: Sally McHugh  
School of Education, National University of Ireland, Galway  
Email: [s.mchugh1@nuigalway.ie](mailto:s.mchugh1@nuigalway.ie)  
Phone: .....

Project Website: [www.eheritage.ie](http://www.eheritage.ie)



## Parent/Guardian Consent Form

I \_\_\_\_\_ (name of parent/guardian) consent  
to \_\_\_\_\_ (name of child) taking part  
in the **TEChE** program during the 2015-16 academic year.

I have been provided with an information letter which outlines the activities my child will take part in, how research data will be collected and stored and how I can contact the research team. I understand that I may withdraw my child from the research project at any time should I wish to do so for any reason and without penalty.

I also know that images of my child may be used for educational purposes about the **TEChE** programme but their names will not be identified.

**Data Protection:** I agree to National University of Ireland, Galway storing of any personal data relating to my child which results from this project. I agree to the processing of such data for any purposes connected with the research project as outlined to me.

*Signature of parent/ guardian:* \_\_\_\_\_

*Date:* \_\_\_\_\_

Sally McHugh (Researcher) – School of Education, National University of Ireland, Galway, Phone: \_\_\_\_\_ Email: [s.mchugh1@nuigalway.ie](mailto:s.mchugh1@nuigalway.ie)  
Supervisor: Dr. Tony Hall - School of Education, National University of Ireland, Galway  
Email: [tony.hall@nuigalway.ie](mailto:tony.hall@nuigalway.ie)



## Teacher Information Sheet

You are invited to participate in the **TECHe** (Technology-Enhanced Cultural Heritage elearning) research project this year. The project is based in National University of Ireland, Galway. The principal investigator is Sally McHugh and her supervisor is Dr. Tony Hall.

The overall research question is to explore if constructionist digital technologies can enhance children's engagement with cultural heritage within a school and museum setting. The project aims to improve children's engagement with local heritage learning and develop skills in teamwork, technology, creativity and problem-solving. Co-created curriculum based online heritage resources will be produced and made available for use by other primary schools.

The **TECHe** programme will take place over a ten week period with a 2 hour session each week. During the programme, workshops will be offered by Ms. Sally McHugh to participating children and these may take place in school or in NUI Galway and/or in the Galway City Museum.

Throughout the programme, the researcher will collect information about students' learning experiences. During class activities, interactions between students working together will be observed. Children will be asked to complete questionnaires, and record/write reflections at various intervals during the programme.

All information that is collected by the researcher will be anonymised and stored in accordance with the Data Protection Act at National University of Ireland, Galway. In the unlikely event that information about illegal activities should emerge during the study, the researchers will follow the school's Child Protection policy and inform the relevant authorities. There may be lectures, PhD thesis, conference presentations and peer-reviewed journal articles written as a result of this project, however the children will not be identified. Ms. McHugh has undergone the Garda Vetting procedures to receive clearance to work with minors.

From time to time, we may also record photographic images of students at work to use in disseminating the research. Use of images will be strictly in accordance with best practice in Child Protection policies and guidelines. Your class have the right to remain anonymous and to choose where your information may be used. Should your class wish to be omitted from any promotional materials, you can still participate in the programme, but no images of you will be used.

Researcher: Sally McHugh  
School of Education, National University of Ireland, Galway  
Email: [s.mchugh1@nuigalway.ie](mailto:s.mchugh1@nuigalway.ie)  
Phone: |  
Project Website: [www.eheritage.ie](http://www.eheritage.ie)

We also wish to seek permission from the students to participate in the research part of the programme. Where appropriate, we would also like to publish work they may create during the programme that would be of educational benefit to other students. Use of images will be strictly in accordance with best practice in Child Protection policies and guidelines. Participation in this programme is voluntary and students may withdraw from the process at any time, for any reason, without penalty and any information already recorded about them will not be used. Should any of the students wish to be omitted from the research part, they can still participate in the programme, but none of their information will be used in the research.

Please sign below to indicate your consent. If you have any questions please do not hesitate to contact us.

Kind regards,


Sally McHugh (principal investigator) and Dr. Tony Hall (supervisor, School of Education, NUI Galway.)

[s.mchugh1@nuigalway.ie](mailto:s.mchugh1@nuigalway.ie), [tony.hall@nuigalway.ie](mailto:tony.hall@nuigalway.ie)

### Information Project Flyer


The flyer is a dark blue vertical rectangle with a white border. At the top left is the NUI Galway logo. In the top center, the word 'TEChE' is written in white on a yellow speech bubble. Below this, six blue circular icons with white text are arranged vertically on the left side. Each icon is followed by text on the right. The icons are labeled 'What?', 'How?', 'Who?', 'Where?', 'When?', and 'More'. At the bottom center, there is another NUI Galway logo.

Question	Answer
What?	Technology-enhanced Cultural Heritage (e)Learning (PhD research project)
How?	Cultural Heritage enquiry, Digital Storytelling, Minecraft
Who?	5th/6th class pupils
Where?	Classroom, Museum, University
When?	2hr. sessions over 10 weeks
More	Sally McHugh <a href="mailto:s.mchugh1@nuigalway.ie">s.mchugh1@nuigalway.ie</a>



# Information for you!

Hello! My name is Sally and I am looking at how children can learn more about people who lived long ago around where you live now. I want to see if children can use computers in school and out of school to learn more about the past.



**Please have a look at this leaflet and call me if you have any questions or would like to know more. Thank you for reading this.**

<b>What is this study about?</b>	This study is about learning about people in the past that once lived in your area. It is about using computers to make heritage lessons that we will put on our website. Other children in other schools can then use the lessons we make to learn more about the past.
<b>What will we be doing?</b>	We will look and see what old ruins/objects are in our area. We will look and see what 5th and 6th class teachers have to teach about the history and heritage in our locality. We will use computers to make lessons for other children in other 5th and 6th classes about our area.
<b>How will it work?</b>	I will bring some small computers with me (tablets). We will have to share and work as teams.
<b>Will what I make be on a website?</b>	Yes, but anything we make on our own will be private. If we make something public no one will know who you are. We will use 'avatars' like this person here, and you will choose a different name too. 
<b>Do I have to do it?</b>	No. You do not have to join in on this project and if you do, you can leave it at any time without having to explain.

## I need to ask your parents or your minders if it is ok for you to work on this project

**Find Out More**

Please feel free to email or ring me to ask any questions. You can also visit the website for more information: **website: [eheritage.ie](http://eheritage.ie)**  
**Phone: € [REDACTED]**  
**email: [s.mchughl@nuigalway.ie](mailto:s.mchughl@nuigalway.ie)**

You can talk about the project to my supervisor in the university. His name is Dr Tony Hall and his email is [tony.hall@nuigalway.ie](mailto:tony.hall@nuigalway.ie)





## Participant Consent Form

I, \_\_\_\_\_ (your name) agree to take part in the research part of the **TEChE** programme.

I have read the information sheet provided about the project and know how information will be used. I understand that I can choose not to take part in the research at any time.

I also know that images of me may be used anonymously for promotional material about the **TEChE** programme and that I can change my mind about this at any time.

**Data Protection:** I agree to National University of Ireland, Galway storing and using my information from this project.

*Signature of participant:* \_\_\_\_\_

*Date:* \_\_\_\_\_

*Signature of Project Leader (NUIG):* \_\_\_\_\_

*Date:* \_\_\_\_\_

Researcher: Sally McHugh  
School of Education, National University of Ireland, Galway  
Email: [s.mchugh1@nuigalway.ie](mailto:s.mchugh1@nuigalway.ie)  
Phone \_\_\_\_\_  
Project Website: [www.eheritage.ie](http://www.eheritage.ie)



Appendix R DC1 Lesson Plan-Outline – School and Museum

DC1– School Lesson Plan Outline

*DC1- S1.1 10 weeks 9-11 a.m. plus a pre and post class visit*

	<b>Intended Lesson Plans</b>	<b>Changes to Lesson Plan (Fig. 1).</b>
<i>Pre Week One</i>	School Visit – Introduction and Pre-Questionnaire	As intended
<i>Week One</i>	introduction to Programme	As intended
<i>Week Two</i>	Introduction to Medieval Galway	Introduction to Medieval Galway and Introduction to iPads and DST technologies
<i>Week Three</i>	Digital Literacies	City walk and tour
<i>Week Four</i>	Digital Story Telling	DST – Planning the overall story and dividing out the individual parts to teams
<i>Week Five</i>	Museum	Minecraft Introduction and set up
<i>Week Six</i>	Minecraft Introduction	
<i>Week Seven</i>	Storyboarding	DST process, Minecraft building
<i>Week Eight</i>	Minecraft Building	
<i>Week Nine</i>	Minecraft Building	Script Writing
<i>Week Ten</i>	Editing	Script Recording
<i>Post-School Visit</i>	Pre-Questionnaire and Group Interview	As intended

DC1– Museum Lesson Plan Outline

*DC1- M1.2 4 days 10-2.30 p.m.*



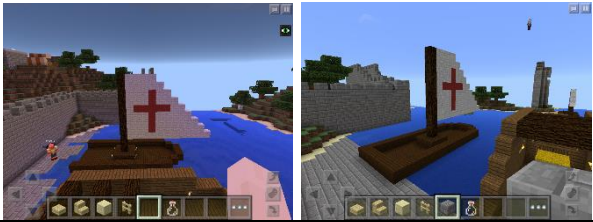


	<b>Intended Lesson Plans</b>	<b>Actual Lesson Plan</b>
<i>Day One</i>		Icebreakers Activities – Introduction to each other, to technologies (website, YouTube) and to DST technologies, discussion on objects, team selection, museum tour
<i>Day Two</i>		Icebreakers Activities – Scavenger hunt, Story preparation, storyboarding, discussion and sharing of processes
<i>Day Three</i>		DST process, creating digital artefacts
<i>Day Four</i>		Post-questionnaire, audio reflections, finish digital artefacts, upload digital story and prepare QR codes for public presentation








Appendix S DC1 S1.1 Digital Artefact Making Process

Five teams were involved in building Galway's medieval city. Each built sections as a team, at the end of the intervention I edited all parts together and added their recorded script for the final 8 minute movie.

<p>St Nicholas Church, Market Cross and Market – 14<sup>th</sup> Century</p>  	<p>Inside St Nicholas Church</p>  
<p>13<sup>th</sup> Century Red Earl Hall</p>  	<p>Stages of Building Red Earl Hall</p>  
<p>Red Earl Hall</p>	<p>Stages of Building Red Earl Hall</p>

Towers on Town Wall		
		
	Town walls, Lynch's Castle (towerhouse), St. Nicholas church – all features of Galway's medieval town	

Team Mistro		Building the 13 <sup>th</sup> century Red Earl Hall
Team MVP		Building St. Nicholas Church (14 <sup>th</sup> Century) and the Market Cross and Stalls

Team Awesome		Building the Town Wall, Towers and Gates
Team SSTD		Building the Spanish Arch, Port, Ships and Port trading stalls
Team Bullseye		Building Lynch's Castle and its interior

Appendix T DC1 - Sample quotes from children's data DC1

Sample Quotes related to Findings – DC1			
Delight			
<i>"I think this project was fun and I really liked playing Minecraft with my friends" (week ten)</i>	<i>"I liked todays class and I think that its going to be fun building things on Minecraft" [+ drawing] (week two)</i>	<i>"I thought it was fun yesterday [+emoji happy face] I love how we got into groups and work together" (week four)</i>	<i>"Today was vry good I really enjoyed presenting our work it was really fun" (week seven)</i>
Positive Learning Experience			
<i>"I enjoyed the tour around Galway. I have been to places like them but never understood what they really mean. I found it very interesting and I cant wait when im in town so I can show my family. I really thank Sally for taking us on that tour" (week three)</i>	<i>"1.I enjoyed today it was fun 2.and I can no wait until the movie Im so hyped" (week nine)</i>	<i>"Today was fun because we were working together and got progress done" (week seven)</i>	<i>"I think it was really fun and I learned so much things about Galway that I didn't know" (week three)</i>
<i>"when using technology you can learn much more and it's way quicker plus you can make songs or games or videos or write a story about it online. It's wayyy funner" (post-questionnaire)</i>	<i>"we used our minds to create history in using technology" (post-questionnaire)</i>	<i>"I think I will rember it more and it is the fun way' (week nine)</i>	<i>"History is fun because you learn about the past. Super fun with technology (so true)" (week nine)</i>

Building and Creating			
"I love to Build stuff" (week four)	"I think that I like it today because I had fun playing Minecraft and learning" (week eight)	"We finally finished building the Red Earl Hall and it was really fun and exciting!" [+emoji happy face"] (week eight)	"I thought today was really fun we got to build the Spanish arch and are stalls" (week seven)

Appendix U Icebreaker museum activities games  
Bingo, Scavenger hunt, Time Traveller Game, Roll the dice.

**Time Capsule Team Game**

If we buried 8 objects from life today in Galway in a time capsule that wouldn't be opened for 100 years what objects would go into the time capsule? **Number them 1-8 in order of importance (Draw or Write)**

Things to remember:

- Try to cover all people that live in and call Galway home
- Ask yourselves are you picking what you like rather than maybe what others like?
- Will people digging up the objects in 100 years time be able to make sense of what they are?
- Include for example foods, drinks, computers, or whatever else you think is important in today's world.


**SCAVENGER HUNT 3**

In your teams, work together to find the following in the Museum (we'll take a few minutes to discuss amongst yourselves how ye could organise this) -

Hint: 1st floor

- Find a letter from the king of England (Take a photo)
- Find an elephant gun (Take a photo)
- Find a helmet worn by the Black and Tans (Take a photo)

Hint: Ground Floor

- Find a spear (Take a photo)
- Find a colourful vase that came from Portugal - (Take a photo)
- Find a gold ring - (Take a photo)

Take a group selfie in front of the Green Post Box

Tell your favourite food

Tell your favourite TV programme

Tell your favourite app

Tell your favourite holiday

Tell your favourite animal

Tell your favourite sport

I have a cat	I live outside Galway City	I am left handed	I Like to read	I have been to another country
I like funny movies	I have a dog	I have the same favourite colour as you	I am an only child	I walk to school
I have been camping	I like football	Free Space	I like to draw	I am a middle child
My name begins with 'D'	I play sports	I am a good runner	I like vegetables	I like swimming
I have a sister	I have a sweet tooth	I have a clean bedroom	I can speak Irish	I have climbed a tree


Appendix V DC1 M1.1 Code Book

Digital Storytelling (narrative)	combining narrative with digital content, constructing a narrative and communicating it, the process of DST (brainstorming, scriptwriting, editing, recording audio, movie)	"today was really fun. It was a fun day because we started on our comic and I love doing this" "Today was great. I really enjoyed picking our piece and researching them. Rating [smiley face]" "today was good because we got to go around and pick stuff to put in a movie"
Meaning Making	A connection with previous understandings, of relevance to children's lives, making sense of themselves, relationship with others, events, processes,	"I liked how you us all the weapons from the past and I liked how each object had a storey behind it. I found it a bit boring at times but overall I'm glad I signed up and looking forward to the rest of the week. I also like to use ipads."
Engagement	engagement is a process comprised of four distinct stages: point of engagement, period of sustained engagement, disengagement, and reengagement (O'Brien and Toms), attributes such as "challenge, positive affect, <u>endurability</u> , aesthetic and sensory appeal, attention, feedback, variety/novelty, interactivity, and perceived user control" (ibid)	"I thought Monday was a bit boring but the rest of the camp is very exciting. I enjoy looking for stuff in the <u>useum</u> . And I like the story writing. Overall Best Camp Ever!!" "Fun! Like School! Tiring, food, tiring, hungry, fun day, tired, going home to bed, fun camp. Looking forward to tomorrow!!!"
Excitement	"A feeling of great enthusiasm and eagerness" (Oxford dictionary), exclamation marks, emoji (happy smiley face)	I thought Monday was a bit boring but the rest of the camp is very exciting. I enjoy looking for stuff in the <u>useum</u> . And I like the story writing. Overall Best Camp Ever!!"
Technology	References to physical tools such as 'ipads', challenges with technical aspects	"Today was great fun. I really enjoyed using the <u>ipads</u> . It was the best day yet. Day rating [smiley face]"
Fun	"Enjoyment, amusement, or <u>lighthearted</u> pleasure" (Oxford dictionary, Hard Fun (challenges) {Papert})	"today was really fun" "Fun! Like School! Tiring, food, tiring, hungry, fun day, tired, going home to bed, fun camp. Looking forward to tomorrow!!!" "It's really fun making videos on history" "Today was great fun. I really enjoyed using the <u>ipads</u> . It was the best day yet. Day rating [smiley face]"
Freedom	Recognising freedom in learning, having choice,	"You can see what you are learning about. You can walk around freely" "the freedom is enjoyable" "as opposed to the forced learning of a school, you go at your own pace"

Appendix W DC1 M1.1 Children's Data Examples from Findings

Features of 'Learning' Theme in the Museum DC1	
Peer to Peer Learning	<i>I enjoyed the team and the learning games. I basically enjoyed everything except when my peach exploded. Today was a okay day" (child reflection)</i> <i>"enjoyable was working with my friends" (children's questionnaire)</i>
Benefits of team learning to an Autistic child	<i>"I also think the opportunity to work with a team and the shared learning experience was very important. As [Child3] is on the autistic spectrum this was particularly beneficial to her as she often struggles with group work and would generally prefer working alone when it comes to academic work and projects. However, she really enjoyed the group and team work experience of this workshop. While she knew the girls in her group before the workshop she still sometimes finds it hard to work with others but did not struggle this time." (Parent survey)</i>
Effectiveness of team learning	<i>"Working as part of a team to accomplish a common goal" (Parent survey)</i>



	<p><i>"My son found the team working skills element really good: he said he really felt that the learnt how to work effectively in a team" (Parent survey)</i></p> <p><i>"She experienced new ideas, explore and experience taking an idea to a final outcome of the short movie, working in a team, meeting and mixing with new people, integrating museum artifacts and history into an every day presentation and better understanding of history in a fun way" (Parent survey)</i></p>
<b>Challenges negotiating group creative work.</b>	<i>"ensure all children get turns at the different aspects involved. I know [child4] asked to direct and film for a while but, wasn't allowed by two other group member's"</i>
<b>The context of learning in the museum was different to learning in school</b>	<p><i>"teaches in a different way from school" (children's questionnaire)</i></p> <p><i>"you can learn history in school but not as much in museums. Museums have more to offer in my opinion" (children's questionnaire)</i></p>
<b>Museums offered more in ways of learning</b>	<p><i>"teaches in a different way from school" (children's questionnaire)</i></p> <p><i>"you can see the stuff your talking about and your not stuck at a desk all day" (children's questionnaire)</i></p>
<b>This enjoyable and fun way of learning history was new and a different way to what children are familiar with</b>	<p><i>"as opposed to the forced learning of a school, you go at your own pace" (children's questionnaire)</i></p> <p><i>"it is more interesting than learning in school or from home" (children's questionnaire)</i></p> <p><i>"it's fun and the opposite of school" (children's questionnaire)</i></p> <p><i>"My son [Child2] loved every minute of the workshop and it would not be something he would have shown any interest in previously. So delighted that he got a chance to experience something different" (Parent survey)</i></p>
<b>The positive learning experience included using technology</b>	<p><i>"it helped me learn more about technology" (children's questionnaire)</i></p> <p><i>"the opportunity to combine his interest in history with learning new tech skills. He really enjoyed being in the museum, it was a different experience and a balance to the sports camps he will do" (Parent survey)</i></p>
<b>By using the artefacts to learn they had opportunities for thinking, understanding and research</b>	<p><i>"in school they look at the factual way but here you can understand it and think" (children's questionnaire)</i></p> <p></p> <p><i>"Today was great. I really enjoyed picking our piece and researching them. Rating [smiley face]" (child reflection)</i></p> <p><i>(child reflection)</i></p>

#### Features of a 'Positive Affect' Theme in Museum DC1




Children enjoyed the overall experience and had fun.	<p><i>"Point one It's brilliant. Point Two: Everything is perfect. Fantastic." (child reflection)</i></p> <p><i>"My son found the team working skills element really good: he said he really felt that the learnt how to work effectively in a team He also really enjoyed the positive learning environment you created: he said he was very comfortable there every day and looked forward to returning each morning He also found it very interesting to be in the museum learning about the artefacts" (Parent survey)</i></p> <p><i>"I learned about some of the stuff in the museum. I also enjoyed the way that you treated us. I hope that tomorrow is like today!" (child reflection)</i></p>
Boredom: references to 'boring' were always included in an overall positive reflection.	<p><i>"I thought Monday was a bit boring but the rest of the camp is very exciting. I enjoy looking for stuff in the museum. And I like the story writing. Overall Best Camp Ever!!" (child reflection)</i></p> <p><i>"I very much enjoyed today. The thing that was slightly boring was the Galway Hooker" [boat] (child reflection)</i></p> <p><i>"I liked how you us all the weapons form the past and I liked how each object had a storey behind it. I found it a bit boring at times but overall I'm glad I signed up and looking forward to the rest of the week. I also like to use iPads" ((child reflection)</i></p>

#### Features of Creating/Making Theme in Museum – DC1

Flow being observed	<i>I had fun whith [with] the comics but I forgot about the lunch and I worked through brake [break]" (child reflection)</i>
Positive Affect connected to technology and story-making	<p><i>"My child loved working on the iPads and the complete freedom to create their own film" (Parent survey)</i></p> <p><i>Today was great fun. I really enjoyed using the iPads. It was the best day yet. Day rating [smiley face]</i></p> <p><i>"It's really fun making videos on history" (child reflection)</i></p> <p><i>"today was really fun. It was a fun day because we started on our comic and I love doing this" (child reflection)</i></p>

<b>Features of 'Choice' Theme Museum DC1</b>	
Children had freedom to spend time in and out of the galleries	<p><i>"You can see what you are learning about. You can walk around freely" (children's questionnaire)</i></p> <p><i>"My child loved working on the iPads and the complete freedom to create their own film" (Parent survey)</i></p>
Children were given complete freedom to choose whatever objects they wished for their stories	<p><i>"Today was great. I really enjoyed picking our piece and researching them. Rating [smiley face]" (child reflection)</i></p> <p><i>"today was good because we got to go around and pick stuff to put in a movie" (child reflection)</i></p> <p><i>"the freedom is enjoyable" (child post-questionnaire)</i></p>
Self-directed learning fostering independence	<i>"The sense of independence it created!" (Parent survey)</i>

#### Appendix X DC1 M1.1 Digital Artefacts


Digital Artefact	Team Name and Description
	Splash page for object stories
	Team Blue Clues- "This is the Claddagh"- a 2.08m video made in <i>iMovie</i> on Nan O'Toole a Galway (Claddagh) fisherwoman. Their video included audio overlay of Nan's story by all team members, their drawings, made props and objects and prints from the museum.
	Team Red Jaguars- "The Bayard Pistol" - 0.35m video was made in <i>Animoto</i> and was about the story of the Bayard Pistol, an object in the museum

	<p>Team Salthill Devon – “Galway’s All-Ireland” - This 0.19m animation was made in Animoto and was made about Galway’s sporting success in 1966</p>
	<p>Team Salthill Devon - “The Story of Martin Mor Mc Donagh” a 0.35m Animoto video on a museum object.</p>
	<p>Team Blu Beanbags – ‘the Smashing Bomb’ - This three page digital comic made in Comic Life combined different objects (Galway Tram, World War One shell, stone axes and images from the museum) and made a new unrelated story</p>
	<p>Team Red Jaguars -“The Elephant Gun” 0.35m Animoto video on the story of a museum object</p>
	<p>Team Blu Beanbags - “The Story of John Higgins” 0.55m iMovie, with narration from all the team members, children used different objects around the museum and combined them into an unrelated (to the objects) story.</p>



## 1 Videos Content Logs



A content log was done on the videos to index at three minute intervals, a description of the major event within the time frame. Derry et al (2010) have pointed to the value of this for getting an overview of data and for further detailed analyses.

VIDEO CONTENT LOG	
School Code: S2.3 - Day one 10 <sup>th</sup> May 2017	
Verbatim Hard Drive Disk - D:\all Videos- original sortings of schools days and colours\videos a\Day One Video 10052017	
Video Timeline and Overview	
<b>Day One- 10<sup>th</sup> May 2017</b> 	
1	<p>Name of file: [redacted] ee (4) 1.97 GB 00:49:54                      2nd half of first day – after morning local physical heritage trip                      Context: Large open airy room in local library, with 4 long desks with 8 chairs each. Projector and screen in room.</p> <p>00:00:00 Children sitting at desks and chatting with each other in local library waiting to start –this camera focused on table with 9 boys Back in library after morning local trip, afternoon – noisy, chatty atmosphere                      00:03:00 – 2 children playing with iPad and come over from another table, group of boys(5) grouped around another iPad playing with it                      00:06:00 – I place audio recorder on desk and explain to children what it for and what I won't use it for, children of back to looking at ipads in groups, 5 boys with one, 2 boys writing and not interested in ipads, and one using iPad on his own                      00:09:00- no changes, as earlier time slot                      00:12:00 – Children. still sitting around and moving to each others tables. chatting. I am putting up the boards we will use later to pin sticky notes on. Start introduction of programme, children sit down, some have hands up to ask teachers questions (the boys that were in the group huddled around the iPad)                      00:15:00 prayers and children standing, then all sit again, I hand out stickie's to [redacted] and ask them to write 3 'What if?' statements about their trip today and to stick on the board, children 5 discussing together, and moving around. I explain it further and how nothing is wrong                      00:18:00 children discussing between each other, some from other tables go to the board and stick their stickie's on, others still thinking and chatting together. I am walking around as in another teacher and main teacher.                      00:21:00 Ask them to stick up all their words, some are still working on it, one boy is looking at all the stuff he recorded in the morning rather than doing the stickies, teacher is helping collect the stickies – children are still wandering up to the board with their 'What If's"                      00:24:00 as above, hand out a sheet for each table with 'How might we?' on it</p>



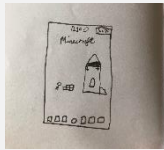

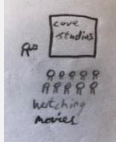
Appendix Z The role of technology in children's drawings

Three interventions from the principal study are detailed below.





DC2 S2.3 The role of technology in Children's drawings

The role of technology in children's drawings								
IPad drawing	IPad showing apps	apps	IPad taking photographs	IPad selfie	IPad with heritage drawing	IPad detailing App with heritage drawing	Other (Audio Recorder, PowerPoint presentation)	
✓✓✓✓✓	✓✓✓✓✓	✓	✓✓	✓	✓✓✓	✓✓	✓✓	
								

DC2 S2.4 The role of technology in children's drawings

The role of technology in children's drawings								
IPad drawing	IPad showing apps	apps	IPad taking photographs of heritage	IPad selfie	IPad with heritage drawing	IPad detailing App with heritage drawing	Other (at table with friends, and presenting to class)	
✓✓	✓✓✓✓✓✓✓	✓	✓✓	✓	✓✓✓	✓	✓✓	
								


DC2 M2.6 The role of technology in children's drawings


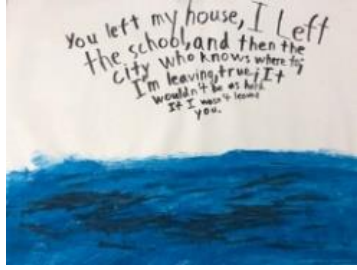
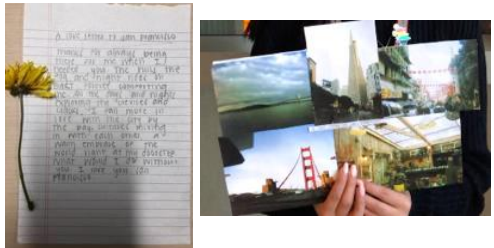

IPad drawing	IPad showing apps	Apps	Other (presenting to class)
✓	✓	✓✓✓	✓
			




Appendix AA DC3 –Weekly Questionnaire for Participants

WEEKLY QUESTIONNAIRE					
March 2 <sup>nd</sup> March 9 <sup>th</sup>	How do the ideas and information we discussed connect to what you already know?	What new ideas did you get that extended or pushed your thinking in new directions?	(A). What is still confusing or challenging for you to get your mind around? (B) What questions, wonderings or puzzles do you now have		
March 16 <sup>th</sup> March 23 <sup>rd</sup> April 6 <sup>th</sup>	Did you engage with place today? If so how? If not, why?	Did any new ideas or thoughts extend or push your thinking in new directions?	What is still confusing or challenging for you to get your mind around? What questions, wondering or puzzles do you now have?	Any other comments on today or the process? (What worked, did not work)	
April 20 <sup>th</sup>	<b>Did you engage throughout the project? If so how?</b>	<b>Did any new ideas or thoughts extend or push your thinking in new directions? Did you learn, gain understanding or awareness?</b>	<b>How do you think the project went overall? How would you describe your experience?</b>	<b>What would you change in the future?</b>	<b>Any other comments on today or the process?</b> (Write on back of sheet if you need to!)
April 27 <sup>th</sup>	N/A	N/A	N/A	N/A	N/A

Appendix BB DC3 - Participants Final Art Pieces and Video Transcriptions

Person	Transcription of Video	Description and Narrative included in Art Piece (if any)
<p>Jenny</p> 	<p><i>Personally I associate place more with people than the actual location like for example if I'm in unfamiliar place but I'm with people I know and that I like I'm happy to be there and I don't really mind how unfamiliar the location is ((pause)) but if I'm in a familiar location but I'm not with anybody I know like I'd rather not be there ((pause)) I'd rather be in a familiar place with people that I know</i></p>	<p>The flowers are another representation of my home. I have many flowers, plants, and trees in and near my house. I love flowers and nature and, like the people, wherever there is nature, I feel comfortable. The cranes symbolise peace and quiet. As much as I enjoy living in the Bay area, the fast-paced lifestyle that comes along with the area can be overwhelming at times. The cranes show that in the future, I would like my place to be somewhere that is serene and calm. All of these elements come together to create what I consider to be important aspects of my place.</p>

<p>Kara</p> 	<p>So place kinda for me means what has shaped me into becoming who I am today and I thought a lot of that was like...here you'll see my chromosomes ((laughs))... and I thought a lot of that was kinda the fact that I'm half [Asian] and half [European] and those kind of places and where they came together for me ((pause)) and just all of my family who have brought me up to the person I am today, that's kind of where my place is</p>	<p>Excerpt of monologue: my grandmother never taught my dad [language] because she wanted him to speak English because everyone always told her to so my dad never let me learn [language] on Rosetta Stone instead I took French I know how to say I want steak and fries je voudrais un steak frites but I couldn't tell you how to say that in [language] I guess I've never been very connected to that side of myself the other day I was talking to my friend he's Chinese and he told me that he forgot I was Asian too and that I didn't look Asian whatsoever and that I couldn't honestly say I was and I wanted to scream and I wanted to cry and I wanted to yell at everyone around me and argue but I couldn't because for a split second there I knew he was right I knew he was right I mean I've never been to the [large country] I don't know how to speak [language]</p>
<p>Nick</p> 	<p>You left my house, I left the school and then the city who knows where to; I'm leaving true; It wouldn't be as hard if I wasn't leaving You.</p>	
<p>Kirstin</p> 	<p>For me place is a sense of place is belonging. So I didn't grow up in San Francisco but I grew up relatively close and this is where my values and my personality and really how I perceive the world and that's what place means to me a sense of belonging and who I am</p>	<p>A love letter to San Francisco Thanks for always being there for me w needed you. The hills the fog and night on BART forever comforting me. All the and nights exploring the crevices and c I fall more in love with the city by the b cultures mixing in with each other, a warm embrace of the world right at my doorstep. What would I do without you I love you San Francisco</p>
<p>Paula</p> 	<p>Something I learned while creating this piece was how dynamic place is like it's constantly changing. It's made by like your memories and like the people who are there in this physical space and the experiences you've made and although the memories don't change your interpretation of those memories can. So (.) yeah (.)and another thing is that one physical place can be so different to two different people ((pause)) in a way like ((pause)) that shows how identity changes how you interpret place but at the same time place is like a huge part of identity so it's like ((pause)) am ((pause)) balancing"</p>	

<p><b>Wade</b></p> 	<p><i>To me place doesn't necessarily have to impact your identity.. but at the same time it can and it doesn't really have to be a physical place, it could be things you identify with or just people around you so you can like bring place with you if you like.. in the people that you associate with yourself.. and different things... so place isn't like a set area but it's something you can bring along with you all your life</i></p>
<p><b>Ruth</b></p> 	<p><i>To me having a sense of place means feeling safe and welcomed with the people you love</i></p>
<p><b>Mimi</b></p> 	<p><i>N/A [For Mimi Place are places that bring 'calm', and are associated with home, nature, family]</i></p>

Appendix CC DC3 - Post Survey Questions Exploratorium Explainers

<p>SURVEY QUESTIONS</p>	<p><a href="https://www.mysurveygizmo.com/s3/5024975/Exploratorium-Explainers">https://www.mysurveygizmo.com/s3/5024975/Exploratorium-Explainers</a></p>
<p>Key</p>	<p>Default Text</p>
<p>survey-title</p>	<p>Exploratorium Explainers</p>
<p>p-1</p>	<p>A Sense of Place Project</p>
<p>p-1-desc q-2</p>	<p>Can you describe what your final finished piece of work <b>meant to you</b>? For example how did you feel about your finished piece, is there a story about your piece, are you proud of it, were you happy with your content, the medium you used to create it etc.,</p>
<p>q-2-otherText</p>	<p>Please enter an 'other' value for this selection.</p>
<p>q-7</p>	<p>Did you enjoy exploring place <b>in this way</b>?</p>
<p>q-7-otherText</p>	<p>Please enter an 'other' value for this selection.</p>
<p>q-7-o-10011</p>	<p>No</p>
<p>q-7-o-10012</p>	<p>Yes</p>
<p>q-7-o-10047</p>	<p>Why?</p>
<p>q-26</p>	<p>Did your awareness or understanding of your place <b>change</b> at the end of the project?</p>

q-26-otherText	Please enter an 'other' value for this selection.
q-26-o-10063	No
q-26-o-10064	Yes
q-26-o-10065	Can you tell me more?
q-26-o-10073	Can you tell me more?
q-27	What is your opinion about the project process?
q-27-otherText	Please enter an 'other' value for this selection.
q-27-o-10068	At the beginning it was clear
q-27-o-10069	At the beginning it was confusing
q-27-o-10070	At the end it was clear
q-27-o-10071	At the end it was confusing
q-27-o-10072	Can you tell me more?...
q-27-o-10081	Can you tell me more?
p-3	A Sense of Place Project with the Exploratorium Explainers
p-3-desc	
q-11	What was the <b>hardest thing</b> ?
q-11-otherText	Please enter an 'other' value for this selection.
q-12	What was the most <b>surprising</b> thing you found?
q-12-otherText	Please enter an 'other' value for this selection.
q-13	What was your <b>favorite</b> part of the project?
q-13-otherText	Please enter an 'other' value for this selection.
q-15	How did you feel about a 'blank page' and <b>few instructions</b> at the beginning of the project?
q-15-otherText	Please enter an 'other' value for this selection.
q-16	What does being <b>creative</b> mean to you?
q-16-otherText	Please enter an 'other' value for this selection.
q-17	Do you believe you developed <b>creative skills</b> during the project ?
q-17-otherText	Please enter an 'other' value for this selection.
q-17-o-10031	No
q-17-o-10032	Yes
q-17-o-10052	Can you tell me more?
q-18	What does <b>playful</b> <b>mean</b> to you in your own words?
q-18-otherText	Please enter an 'other' value for this selection.
q-25	Were you satisfied with the playful learning aspect of this project?
q-25-otherText	Please enter an 'other' value for this selection.
q-25-o-10055	Very dissatisfied
q-25-o-10056	Dissatisfied
q-25-o-10057	Neutral
q-25-o-10058	Satisfied
q-25-o-10059	Very Satisfied
q-25-o-10060	Can you tell me more?
q-19	How did you feel about <b>sharing your thoughts</b> <b>and work progress</b> in group discussions?
q-19-otherText	Please enter an 'other' value for this selection.
q-20	How did you feel about <b>sharing your work publicly</b> ?
q-20-otherText	Please enter an 'other' value for this selection.



q-21	Can you name <b>one thing</b> that engaged you (even in a small way) with your place?
q-21-otherText	Please enter an 'other' value for this selection.
q-22	Do you think if we had used computers/iPad/cell phones to make your pieces <b>might your personal experience may have been different</b>?
q-22-otherText	Please enter an 'other' value for this selection.
q-23	If you could <b>change one thing</b> for any future projects with teenagers what would it be?
q-23-otherText	Please enter an 'other' value for this selection.
p-2	Thank you! I really enjoyed working with you all. Thanks again for your participation in the project, have a great summer!

*Appendix DD DC3 Type of Coding Methods Used*

	Types of Coding Methods Used (following Saldaña 2016)			
Weekly Sessions 2019	Participant Reflection Sheets 1 <sup>st</sup> Cycle – initial units of analysis	Participant Reflection Sheets 1 <sup>st</sup> -Cycle Reorganisation of Categories	Transcription of weekly session between participants and researcher	All Data 2 <sup>nd</sup> Cycle
March 2nd	Process, In Vivo, Descriptive, Values, Holistic	Process	Descriptive	Pattern
March 9th	Descriptive		N/A	Pattern
March 16th	Process, In Vivo, Descriptive, Values, Holistic	Process, In Vivo, Descriptive, Values, Holistic	Descriptive	Pattern
March 23rd	Process, In Vivo, Descriptive, Values, Holistic	Process, Values	Holistic Descriptive	Pattern
April 6th	Process, In Vivo, Descriptive, Values, Holistic	Process	Holistic Descriptive	Pattern
April 20 <sup>th</sup>	Process, In Vivo, Descriptive, Values, Holistic	Process	Holistic Descriptive	Pattern
April 27 <sup>th</sup> - Videos	N/A	N/A	Holistic Descriptive	Pattern
Survey	N/A	N/A	Descriptive	Pattern

Appendix EE DC3 Codebook extract (Values Coding)

CODE	Includes:	Example
Thinking	Usually a realisation of something that would require a lot of thinking to come to that point, self-reflection thinking, thinking about uncertainty what does something mean, being intellectually curious	"What puzzles me is whether or not personal connections are more valuable than physical connection as time goes on."
Interested	Saying or doing something that shows they are interested, like pondering on their art piece, adding detail to previous work, listening to others and doing something productive after, being inspired, planning ahead, observing, paying attention, an Exclamation mark after a YES!	"I did interact with place today more so than usual because I went to the city with my best friend who doesn't come here often so we paid more attention to things I normally overlook" "I added mostly small details since I finished the main part last time"
Reflective	Thinking back, deeper thinking	"I honestly have never thought about how location relates to identity" "It's given me an insight into what kind of person I am"
Curious	Wondering about something in the future, wondering why	"I enjoyed and also look forward to learning more about informal learning because I know the concept of it but not the details and the specifics" "What puzzles me is whether or not personal connections are more valuable than physical connection as time goes on." "I don't know what the final finished product should be about."
Explorative	Trying different things, curious to try something.	"I feel like having many different materials was a good thing"
Content	Happy with work process, happy with idea	"It went well!" "I think the project went well, I enjoyed creating art and the open ended question" "I'm pretty set; I'm pretty happy with my idea"
Confidence	Happy to produce or speak on work that is personal, knowing what to do without being told (decisive)	"The ideas and information we discussed reaffirmed how I see and identify myself"
Open	Similar to confidence, open personality, open to ideas, not	"It gives me a new perspective on how different people describe identity and

Appendix FF DC3 Coding methods brought from 1st cycle coding to themes

An overview of coding in DC3. Each colour represents a different coding method.

The image displays a large, multi-colored grid representing coding methods. The grid is composed of numerous small rectangular blocks, each containing text or symbols. The colors used include yellow, blue, green, red, orange, and grey. The text within these blocks is often fragmented and difficult to read, but it appears to be a collection of codes or labels used in the DC3 coding process. The overall layout is dense and organized into several vertical columns, suggesting a systematic approach to coding different aspects of the data.



Appendix GG DC3 Initial coding of units of meaning into categories

These UOMs are categorised under headings, which subsequently are brought to themes

<b>connecting to place</b>	<b>Identity/Heritage</b>	<b>Uncertainty</b>	<b>Certainty on project</b>
Feeling I Engaging with place as I drew my neighbourhood	thinking about my roots	feeling uncertain about art piece	knowing how to progress
Feeling I engaged with place as I thinking of all the places in my life and neighbourhood	Connecting my place to my heritage	finding hard to get started	making a decision to go with something
Feeling I engaged with place as I thinking of all the places in my life and neighbourhood	realising place is important to who I am	feeling uncertain finding it hard to	finding art piece working
Feeling I engaged with place as I drew my place in the world	connecting to place through my DNA	think of things on the spot in my art piece	
Thinking of places I usually go			finding project going well and wouldn't change anything
trying to understand how place affected my worldview			
feeling I've a negative attitude towards place and want to reflect more to be more balanced			
thinking about place but not necessarily engaging with it not interacting or paying attention to/with place because of distractions especially technology			
working with visual arts great to show understanding of place and our meaning of place			
<b>Gratitude</b>	<b>Seeing Possibilities</b>	<b>Freedom of Choice and Expression</b>	<b>Human Aspect of Place</b>
thanking researcher for art supplies	seeing other possibilities in art piece	enjoying freedom to create what we want	finding human interactions impact place
		being able to be expressive worked for the project	
<b>Enjoyment/Excitement</b>			
finding it exciting to write a poem and do more visual arts			

Appendix HH DC3 Mapping Relationships between concepts and pattern codes

Date	Pattern Code	Statement
2 <sup>nd</sup> March 2019	<b>Too busy for 'Me', School is our focus, No rootedness in place</b>	Teenagers have a good sense of their own identities but have difficulties relating to place and do not have a rootedness in Place. They have busy lives with a strong focus on school and not enough time for creative pursuits or hobbies. The Pattern Codes are <b>Too busy for 'Me', School is our focus, No rootedness in place</b>
9 <sup>th</sup> March 2019	<b>Uncertainty about place</b>	There is difficulty trying to make meaning of place. While recognising place is human interactions with people and surroundings, that it means different things to different people, there is confusion about the value of physical location versus personal connections. Observing their wide geographical area from a wide viewing setting at museum new thinking was developed on perspectives (whose), and inequalities such as the wealth gap and homelessness. Uncertainty what to include how to go about the project is a concern. The Pattern Code is <b>Uncertainty about place</b>
16 <sup>th</sup> March 2019	<b>What is place and what's it to do with me?</b>	Place as a concept is hard to understand and the teenagers are trying to connect in ways of thinking about their present and past places and the human relationships within these places. They are linking place and identity and finding the visual arts and freedom of expression a challenge but a help in the meaning making process. The Pattern Code is <b>What is place and what's it to do with me?</b>
23 <sup>rd</sup> March 2019	<b>Making meaning through art</b>	There is deep thinking about identity, physical locations and personal relationships with place. There is positive feelings towards the art end of the project, learning from and being inspired by others, with uncertainty about one's own direction and the meaning of what place is. The Pattern Code is <b>Making meaning through art</b>
6 <sup>th</sup> April 2019	<b>Searching for a way through the fog, Engagement with the arts can deepen understanding of place</b>	There is ongoing confusion with what place is and what it means. In the participants development of making meaning, place means people. The ongoing process of making their art pieces, the engagement with the Arts is helpful in defining and interpreting and understanding place. Pattern codes are <b>Searching for a way through the fog</b> and <b>Engagement with the arts can deepen understanding of place</b>
20 <sup>th</sup> April 2019	<b>A sense of place means I belong</b>	Today (at the end of the making sessions) is although place is still associated with identity, people/relationships and to an extent location (if it is tied to people), when reflected upon, belonging is a new addition to the participants understanding of place. Participants find the arts are conducive to engagement with and to the informal learning aspect of place. Pattern codes is <b>'A sense of place means I belong'</b>
27 <sup>th</sup> April 2019	<b>Place is...</b>	<b>Place</b> means my family, heritage and friends. Place means a sense of belonging and who am I, my values perspectives and worldviews. It is a dynamic concept that is constantly changing, place and identity influence each other. A space becomes a place with human interaction, making experiences and memories together. Place is more people than location. Place as a physical location means little unless people and relationships are included. Place is a portable concept in that a place means things you identify with and who you associate with. On the other hand place are places to find calm and to enhance well-being. The Pattern Code is <b>Place is...</b>
Post Survey – June 2019	<b>'Ways of seeing'</b>	Statement: Teenagers are gaining new perspectives of place since the beginning of the project when identity was the focal point of their understandings. Sharing and learning from peers, using creative arts to engage with place helped them with make meaning although the unstructured messy typed of learning was challenging. Whether digital technology may have helped or not with engagement of place, responses were split down the middle, yes it may have produced a more polished and/or different final piece but no because of its ubiquity it is boring and if 90% of the process was cognitive, only the physical creation of a final piece would be different. The Pattern Code is <b>'Ways of seeing'</b>