



Provided by the author(s) and University of Galway in accordance with publisher policies. Please cite the published version when available.

Title	Students as creators: The impact of digital innovation on Irish-language learning
Author(s)	Ní Dhubhda, Rose
Publication Date	2019-07-23
Publisher	NUI Galway
Item record	http://hdl.handle.net/10379/15300

Downloaded 2024-04-17T12:11:30Z

Some rights reserved. For more information, please see the item record link above.





Students as Creators:
The Impact of Digital Innovation on
Irish-Language Learning

by

Rose Ní Dhubhda, B.A., M.Sc.

Supervisor Dr. Brendan MacMahon

A thesis submitted to the School of Education, National
University of Ireland, Galway, for the degree of Doctor of
Philosophy

Aibreán 2019

TABLE OF CONTENTS

TABLE OF FIGURES	VIII
TABLE OF TABLES	X
LIST OF ACRONYMS AND ABBREVIATIONS	XI
DECLARATION	XII
ABSTRACT	XIII
ACKNOWLEDGEMENTS	XIV
1 CHAPTER ONE: INTRODUCTION	1
1.1 INTRODUCTION.....	1
1.2 RESEARCH PROBLEM	1
1.3 AIM OF STUDY.....	2
1.4 RESEARCH OUTCOMES	4
1.5 RESEARCH QUESTIONS.....	4
1.6 RESEARCH RATIONALE	4
1.7 BIOGRAPHICAL MOTIVATION	7
1.8 INSTRUCTIONAL INTERVENTION.....	8
1.9 SUMMARY OF CHAPTERS.....	9
2 CHAPTER TWO: THEORETICAL FRAMEWORK	12
2.1 INTRODUCTION.....	12
2.2 UNDERLYING LEARNING THEORIES.....	12
2.2.1 <i>BEHAVIOURISM AND CONSTRUCTIVISM</i>	12
2.2.2 <i>CONSTRUCTIONISM</i>	14
2.3 THEORIES OF LEARNING INFORMING THE INSTRUCTIONAL INTERVENTION	14
2.3.1 <i>TECHNOLOGY-ENHANCED LEARNING</i>	16
2.3.2 <i>COLLABORATIVE LEARNING</i>	17
2.4 CONCLUDING REMARKS	20
3 CHAPTER THREE: THE IRISH LANGUAGE.....	22
3.1 INTRODUCTION.....	22
3.2 THE IRISH LANGUAGE.....	22
3.2.1 <i>THE IRISH LINGUISTIC LANDSCAPE</i>	22
3.2.2 <i>THE IRISH LANGUAGE TODAY</i>	23

3.2.3	<i>THE IRISH PRIMARY SCHOOL CONTEXT</i>	24
3.2.4	<i>THE PRIMARY SCHOOL CURRICULUM</i>	25
3.3	CHALLENGES ASSOCIATED WITH IRISH LANGUAGE TEACHING AND LEARNING	31
3.3.1	<i>EXTERNAL CHALLENGES</i>	31
3.3.2	<i>INTERNAL CHALLENGES</i>	32
3.4	PEDAGOGICAL APPROACHES ADOPTED IN THE LANGUAGE CLASSROOM	35
3.4.1	<i>TRADITIONAL PEDAGOGICAL APPROACHES</i>	35
3.4.2	<i>CONSTRUCTIVIST PEDAGOGICAL APPROACHES</i>	37
3.5	CONCLUSION	46
4	CHAPTER FOUR: LITERATURE REVIEW	47
4.1	INTRODUCTION.....	47
4.2	TECHNOLOGY IN THE CLASSROOM	47
4.2.1	<i>TRADITIONAL USE OF TECHNOLOGY</i>	47
4.2.2	<i>CONSTRUCTIVIST USE OF TECHNOLOGY</i>	48
4.2.3	<i>DIGITAL FLUENCY</i>	49
4.3	TECHNOLOGY-ENHANCED LEARNING.....	51
4.3.1	<i>DIGITAL STORYTELLING</i>	52
4.3.2	<i>ANIMATED STORYTELLING</i>	53
4.3.3	<i>CODING</i>	56
4.3.4	<i>PEDAGOGICALLY-INTEGRATED LEARNING</i>	57
4.4	DIGITAL LANDSCAPE IN IRISH PRIMARY SCHOOLS	67
4.5	BARRIERS TO TECHNOLOGY INTEGRATION.....	68
4.5.1	<i>FIRST-ORDER BARRIERS</i>	68
4.5.2	<i>SECOND-ORDER BARRIERS</i>	69
4.6	CONCLUSION	70
5	CHAPTER FIVE: RESEARCH METHODOLOGY	72
5.1	INTRODUCTION.....	72
5.2	CONCEPTUAL FRAMEWORK	73
5.2.1	<i>PROCESS OF INQUIRY</i>	73
5.2.2	<i>RESEARCH PARADIGM</i>	75
5.3	RESEARCH APPROACH	79
5.3.1	<i>ETHNOGRAPHIC APPROACH</i>	79
5.3.2	<i>DESIGN-BASED RESEARCH APPROACH</i>	80
5.3.3	<i>MIXED METHODS APPROACH</i>	82
5.4	RESEARCH PARTICIPANTS	84
5.4.1	<i>STUDENT PARTICIPANTS</i>	84

5.4.2	<i>PARENT PARTICIPANTS</i>	84
5.4.3	<i>TEACHER PARTICIPANTS</i>	85
5.5	DATA COLLECTION METHODS.....	85
5.5.1	<i>PARTICIPANT OBSERVATION</i>	85
5.5.2	<i>QUESTIONNAIRE INSTRUMENT</i>	92
5.5.3	<i>INTERVIEW INSTRUMENT</i>	98
5.5.4	<i>STUDENT FEEDBACK SESSIONS</i>	100
5.5.5	<i>IRISH LANGUAGE TESTS</i>	103
5.6	VALIDITY AND RELIABILITY PROCEDURES.....	105
5.6.1	<i>DATA VALIDITY</i>	106
5.6.2	<i>RELIABILITY</i>	108
5.7	ETHICAL ISSUES	109
5.7.1	<i>INFORMED CONSENT</i>	109
5.7.2	<i>CONFIDENTIALITY</i>	110
5.7.3	<i>RISKS AND BENEFITS</i>	111
5.8	PILOTING OF RESEARCH INSTRUMENTATION	111
5.8.1	<i>INSTRUMENT DESIGN REVISIONS</i>	112
5.9	DATA ANALYSIS	114
5.9.1	<i>THEMATIC ANALYSIS</i>	114
5.9.2	<i>CONVERSATION ANALYSIS</i>	119
5.9.3	<i>DESCRIPTIVE STATISTICAL ANALYSIS</i>	121
5.9.4	<i>DATA MANAGEMENT SYSTEM</i>	123
5.10	CONCLUDING REMARKS	124
6	CHAPTER SIX: OVERVIEW OF INTERVENTION	126
6.1	INTRODUCTION.....	126
6.2	CONTEXT OF INSTRUCTIONAL INTERVENTION.....	126
6.3	THE DESIGN PROCESS	128
6.3.1	<i>DESIGN CONJECTURES</i>	128
6.3.2	<i>DESIGN REQUIREMENTS</i>	130
6.4	THE TALES MODEL.....	131
6.5	EMBODIMENT OF THE DESIGN	132
6.5.1	<i>THE STUDENTS</i>	132
6.5.2	<i>THE CLASSROOM TEACHER</i>	133
6.5.3	<i>THE CLASSROOM SETTING</i>	134
6.5.4	<i>STUDENT LEARNING APPROACH</i>	136
6.5.5	<i>STUDENT LEARNING ACTIVITIES</i>	143
6.6	CONCLUSION	161

7	CHAPTER SEVEN: DESIGN CYCLE ONE (PILOT)	162
7.1	INTRODUCTION	162
7.2	OBSERVATIONAL PERIOD	163
7.2.1	<i>INSTRUCTIONAL APPROACH</i>	163
7.2.2	<i>STUDENT LEARNING</i>	166
7.2.3	<i>IRISH LESSON ACTIVITIES</i>	166
7.2.4	<i>TECHNOLOGY USE IN THE CLASSROOM</i>	170
7.3	INNOVATIVE LANGUAGE LEARNING ACTIVITIES	171
7.3.1	<i>INNOVATIVE IRISH LESSON STRUCTURE</i>	171
7.3.2	<i>THE DIGITAL STORYTELLING PROCESS</i>	173
7.4	OBSERVATIONS FROM ITERATION ONE	179
7.4.1	<i>LANGUAGE IN USE</i>	179
7.4.2	<i>LEARNING ACTIVITY</i>	183
7.4.3	<i>TECHNOLOGY</i>	188
7.4.4	<i>ENGAGEMENT</i>	190
7.5	MODIFICATIONS INFORMING ITERATION TWO	194
7.5.1	<i>LANGUAGE</i>	194
7.5.2	<i>STORYBOARD ACTIVITY</i>	194
7.5.3	<i>TECHNICAL ISSUES</i>	195
7.5.4	<i>COLLABORATIVE ISSUES</i>	195
7.6	CONCLUSION	196
8	CHAPTER EIGHT: DESIGN CYCLE TWO (MAINSTREAM)	197
8.1	INTRODUCTION	197
8.2	INNOVATIVE LANGUAGE LEARNING ACTIVITIES	197
8.2.1	<i>IRISH LESSON STRUCTURE</i>	197
8.2.2	<i>THE ANIMATED STORYTELLING PROCESS</i>	198
8.3	TWEAKS MADE TO ITERATION TWO	204
8.3.1	<i>LANGUAGE</i>	204
8.3.2	<i>DICTIONARIES</i>	205
8.3.3	<i>STORYBOARD ACTIVITY</i>	206
8.3.4	<i>PEER CORRECTIONS</i>	207
8.3.5	<i>DIGITAL RECREATION ACTIVITY</i>	209
8.3.6	<i>STUDENT PRESENTATIONS</i>	210
8.4	OBSERVATIONS FROM ITERATION TWO	211
8.4.1	<i>LANGUAGE IN USE</i>	211
8.4.2	<i>LEARNING ACTIVITY</i>	214
8.4.3	<i>TECHNOLOGY</i>	224

8.4.4	<i>ENGAGEMENT</i>	225
8.5	MODIFICATIONS INFORMING ITERATION THREE	231
8.5.1	<i>LANGUAGE ACTIVITY</i>	231
8.5.2	<i>TECHNICAL CONSIDERATIONS</i>	232
8.6	CONCLUSION	233
9	CHAPTER NINE: DESIGN CYCLE THREE (CAPSTONE)	234
9.1	INTRODUCTION	234
9.2	INNOVATIVE LANGUAGE LEARNING ACTIVITIES	234
9.2.1	<i>IRISH LESSON STRUCTURE</i>	235
9.2.2	<i>SCRATCH</i>	236
9.2.3	<i>INTRODUCING SCRATCH TO STUDENTS</i>	239
9.3	TWEAKS MADE TO ITERATION THREE	243
9.3.1	<i>SUSTAINED ENGAGEMENT THROUGH TECHNOLOGY VARIATION</i>	244
9.3.2	<i>DIGITAL BADGES</i>	244
9.3.3	<i>STUDENT PRESENTATIONS</i>	248
9.4	OBSERVATIONS FROM ITERATION THREE	250
9.4.1	<i>LANGUAGE IN USE</i>	250
9.4.2	<i>LEARNING ACTIVITY</i>	254
9.4.3	<i>TECHNOLOGY</i>	262
9.4.4	<i>ENGAGEMENT</i>	270
9.5	CONCLUSION	275
10	CHAPTER TEN: FINDINGS AND DISCUSSION	276
10.1	INTRODUCTION	276
10.2	SUMMARY OF INSTRUCTIONAL INTERVENTION	276
10.3	EVALUATION OF INSTRUCTIONAL INTERVENTION	277
10.3.1	<i>LANGUAGE GAINS</i>	277
10.3.2	<i>PARENTAL SUPPORT</i>	282
10.3.3	<i>THE FOLLOWING YEAR</i>	285
10.4	OTHER FINDINGS	290
10.4.1	<i>HOW TEACHERS VIEW AND USE TECHNOLOGY IN THEIR CLASSROOMS</i>	291
10.4.2	<i>VIEWS AND USE OF TECHNOLOGY IN THE IRISH-LANGUAGE CLASSROOM</i>	293
10.4.3	<i>BARRIERS TO TECHNOLOGY-INTEGRATED LEARNING</i>	296
10.4.4	<i>IRISH CURRICULUM</i>	297
10.5	CONCLUSION	300
11	CHAPTER ELEVEN: CONCLUSION AND RECOMMENDATIONS	301
11.1	INTRODUCTION	301

11.2	INITIAL CONCERNS OF TEACHER	301
11.3	RESEARCH CONTRIBUTION	302
11.4	RESEARCH OUTPUTS	305
11.5	DESIGN PRINCIPLES.....	305
11.5.1	<i>KEY DESIGN PRINCIPLE ONE: TECHNOLOGY</i>	306
11.5.2	<i>KEY DESIGN PRINCIPLE TWO: ACTIVITY</i>	306
11.5.3	<i>KEY DESIGN PRINCIPLE THREE: LANGUAGE LEARNING</i>	307
11.5.4	<i>KEY DESIGN PRINCIPLE FOUR: ENGAGEMENT</i>	307
11.5.5	<i>KEY DESIGN PRINCIPLE FIVE: STORY</i>	308
11.6	VALIDITY OF STUDY	308
11.7	FUTURE IMPLEMENTATION	311
11.8	FUTURE RECOMMENDATIONS.....	312
11.9	FINAL REMARKS	313
	REFERENCEES	316
	APPENDICES	336

Table of Figures

Figure 2.1: Learning Theories Undergirding Instructional Intervention.....	15
Figure 3.1: Instructional Scaffolding in Language Classroom	45
Figure 4.1: TPACK Framework (Koehler & Mishra, 2009).....	59
Figure 5.1: Process of Inquiry	74
Figure 5.2: Research Paradigm	78
Figure 5.3: Recording Equipment	89
Figure 5.4: Pilot Revision	113
Figure 5.5: Codes in NVivo	117
Figure 5.6: Codes in NVivo Displaying Corresponding Video	118
Figure 5.7: Mind Map of Themes	119
Figure 5.8: List of Codes for Parental Questionnaire	122
Figure 5.9: Parental Questionnaire Analysis.....	122
Figure 5.10: List of Codes for Student Questionnaires.....	122
Figure 5.11: Analysis of Student Questionnaire 1	123
Figure 5.12: Analysis of Student Questionnaire 2	123
Figure 6.1: Conjecture Map	130
Figure 6.2: Tales Model.....	132
Figure 6.3: Classroom Topology	134
Figure 6.4: Cluster Topology for Innovative Activities.....	135
Figure 6.5: Students Working Collaboratively	136
Figure 6.6: Time Spent on Teaching Irish each Week.....	137
Figure 6.7: Irish Lesson Delivery over a Two-Week Period	138
Figure 6.8: Tinkering Approach.....	140
Figure 6.9: Symbaloo of Technology Tools	149
Figure 6.10: My Cute Graphics Website	151
Figure 6.11: Vocaroo Audio Web Application.....	151
Figure 6.12: ABCya Paint Web Application	152
Figure 6.13: Searching for Halloween Images in Irish on DuckDuckGo	152
Figure 6.14: SAMR Model (Puentedura, 2012, p.6).....	154
Figure 6.15: Scaffolds Incorporated into TALES	155
Figure 6.16: Data Collection in the Classroom.....	160
Figure 7.1: Irish Language Lesson Pattern	165
Figure 7.2: Innovative Irish Lesson Structure.....	172
Figure 7.3: Student-Completed Storyboard	176
Figure 7.4: Dáithí's Group's Digital Story in LBT	177

Figure 7.5: Lisa's Story within LBT	192
Figure 8.1: Innovative Irish Lesson Structure.....	198
Figure 8.2: Go Animate for Schools' Interface	199
Figure 8.3: Completed Storyboard Template.....	202
Figure 8.4: Students Learning Together	204
Figure 8.5: Students Working Together.....	206
Figure 8.6: My Cute Graphics: Search by Halloween Category.....	210
Figure 8.7: Students Interacting on GA in Irish.....	220
Figure 8.8: Students Interacting on Go Animate	230
Figure 8.9: John's Animated Irish Story Created Outside of Class.....	230
Figure 9.1: Irish Lesson Structure.....	235
Figure 9.2: Scratch's Interface.....	237
Figure 9.3: Storyboard Activity	241
Figure 9.4: Digital Recreation Activity.....	241
Figure 9.5: Scratch Script Created by Students	243
Figure 9.6: Digital Badges Scheme.....	246
Figure 9.7: Scratch Code.....	249
Figure 9.8: Students Helping Each Other Record their Voices	259
Figure 9.9: Students Commenting in Irish.....	261
Figure 9.10: Students Offering Technical Advice	261
Figure 9.11: Class Scratch Studio.....	263
Figure 9.12: Student Scratch Account	264
Figure 9.13: Students Using Basic Wait Blocks	268
Figure 9.14: Students Using More Advanced Broadcast Blocks.....	268
Figure 9.15: Coded Story Created Outside of Class	272
Figure 10.1: Short Essay Written by Third-Class Student.....	280
Figure 10.2: Parental Feedback Before and After Intervention	283
Figure 10.3: Parental Feedback.....	283
Figure 10.4: Student Message after Intervention	284
Figure 10.5: Positive Aspects of Technology-Integrated Learning	292
Figure 10.6: Technologies Employed in Irish Language Lessons	294
Figure 10.7: Other Irish Language Technologies Teachers Use.....	294
Figure 10.8: Barriers to Technology-Integrated Learning	296
Figure 11.1: TALEs Framework	303
Figure 11.2: Vocabulary Word Cloud.....	417

Table of Tables

Table 6.1: Textbook Chapter Delivery	141
Table 6.2: Learning Activities	143
Table 6.3: Digital Storytelling Rubric.....	158
Table 7.1: Larry's Group's Digital Story in Tabular Format	178
Table 7.2: Lisa's Six-Page Story	192
Table 8.1: Animated Story Created in Class.....	202
Table 8.2: Áine's Animated Irish Story Created Outside of Class.....	227
Table 8.3: Carragh's Animated Irish Story Created Outside of Class.....	228
Table 8.4: Larry's Animated Irish Story from Home	229
Table 8.5: John's Animated Irish Story Created Outside of Class	231
Table 9.1: Coded Animated Story Completed by Group.....	242
Table 9.2: Scratch Story Created Outside of Class	273
Table 9.3: Scratch Story Created Outside of Class	274
Table 9.4: Scratch Story Created Outside of Class.....	275
Table 10.1: Overall Class Average Mark between January and May.....	281
Table 10.2: Individual Student Marks between January and May	281
Table 10.3: Animated Story 1 created by Sixth-class Students	287
Table 10.4: Animated Story 2 created by Sixth-class Students	288
Table 10.5: Questionable Positive Aspects of Technology-Integrated Learning.....	292
Table 10.6: Respondents Receptiveness to Student-created Animations in Irish Class .	295
Table 11.1: Data Collection Summary.....	406
Table 11.2: Lesson Plan.....	413
Table 11.3: My Digital Story	415
Table 11.4: My Animated Story	419
Table 11.5: My Coded Animated Story	423
Table 11.6: Quiz Based on my Scratch Story	426

List of Acronyms and Abbreviations

CAI.....	Computer Assisted Instruction
CPD.....	Continuous Professional Development
DBR.....	Design-based Research
DES.....	Department of Education and Skills
GA.....	Go Animate for Schools
INTO.....	Irish National Teacher's Organisation
IWB.....	Interactive Whiteboard
LBT.....	Little Bird Tales
MCG.....	My Cute Graphics
NCCA.....	National Council for Curriculum and Assessment
NTQ.....	National Teacher Questionnaire
PSC.....	Primary School Curriculum
TALES.....	Technology, Activity, Language Learning, Engagement, Story
TPACK.....	Technological Pedagogical and Content Knowledge
ZPD.....	Zone of Proximal Development

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.

Rose Ní Dhubhda

Aibreán 2019

Abstract

The overall aim of this study is to explore the possibilities for enhancing the Irish-language learning experience in English-medium primary school classrooms through students collaboratively constructing digital artefacts via design-based learning activities. Specifically, the researcher investigates the potential of digital storytelling and animation tools to enhance students' attitudes towards and abilities in the Irish language. This study culminates in a practical innovative model called TALES (Technology, Activity, Language Learning, Engagement and Story). It supports a student-centred, technology-enhanced, design-based, constructionist and collaborative approach to language learning. It can be adopted and adapted by Irish-language teachers to foster a more active, communicative and creative approach to language learning.

TALES engaged students in innovative Irish-language learning activities. Curriculum was upheld through students writing stories around curricular themes and drawing on specific language constructs in the process. Technology learning was supported through students engaging in meaningful design activities using constructionist tools as they created digital and animated stories. TALES integrates all four language skills through the storytelling phase and then maps them to four corresponding multimedia skills during the digital recreation phase, developing language and technology skills in the process. TALES externalises student thinking whilst they collaboratively create sharable learning artefacts, negotiating meaning and deepening learning in the process. It engages students in the meaningful production of the Irish language, providing them with increased and spontaneous opportunities to speak and write the language through creative writing and digital recreation activities, and all through the medium of Irish.

TALES not only offers a possible solution to the problem of underachievement in Irish in English-medium schools, but it is also a powerful and inspiring example of how Irish can be taught and learned in a meaningful fun way. Students were intrinsically motivated to learn. They showed a greater interest in Irish and demonstrated a more positive attitude towards the language. Their comprehension and written skills improved. While their oral skills also improved and students made more of an attempt to speak in Irish, it was at a slower rate. They also became more digitally fluent as they became more adept at designing and creating, and they developed interpersonal, communicative and problem-solving skills in the process.

Acknowledgements

Ba mhaith liom buíochas ó chroí a ghabháil le mo stiúrthóir, Dr. Brendan MacMahon, as a chuid tacaíochta agus comhairle le linn an aistir seo. Thank you for your guidance, advice, support and kindness. You never once doubted my ability to overcome, to persist and complete. It was an honour to be your student. I wish you every happiness and success in your next venture. I also wish to thank the academic members of my Graduate Research Committee, Dr. Tony Hall, Dr. Sharon Flynn and Dr. Dorothy Ní Uigín, for all your advice and expertise. I would like to thank Andrea, Bonnie and Niall for their ongoing support, inspiration and encouragement along the way! I would also like to thank my external examiners Prof. Leigh Graves Wolf, Mary Lou Fulton Teachers College, Arizona State University, and Dr. Melanie Ní Dhuinn, School of Education, Trinity College Dublin, and my internal examiner, Dr. Tony Hall, School of Education, National University of Ireland, Galway, for a wonderful viva voce and for your expert advice and guidance.

Sincere gratitude to my third-class students. It was an absolute joy to spend time with you. Thank you for always welcoming me into your classroom. I loved watching you learn. Go n-éirí libh ar bhur mbóthar! Agus Joanne! I am eternally grateful to you for opening your world to me, for being open to my ideas and for sharing your time, your expertise, and your insight. I have a friend for life in you.

Thank you to my sharper fitness and running crew; TP and P in particular. Being physically challenged helped keep my mind strong and my heart light. And to my Barna crew, Natasha especially. You are the ultimate source of distraction. I am lucky to count you all as friends.

To my family, my mom in particular, for being a constant presence in our lives. To my two sidekicks, Conall and Sadhbh, I'm finally finished writing my story! Thank you for your patience and your curiosity in all of this, but most importantly, thank you for picking me. I never take a minute of you for granted. To my sister, Irene, thank you for taking them on their little adventures each week, especially in this last year when I couldn't always be there.

Finally, I would like to thank my husband, Conor, for making this journey a reality for me; for always believing in me; for the countless weekends and for shouldering the burden of family life this past year in particular. Thank you for always letting me be me.

Do Chonall agus Sadhbh

1 CHAPTER ONE: INTRODUCTION

1.1 INTRODUCTION

The opening chapter of the thesis describes the main aim of this research and the researcher's rationale and motivation for undertaking it. It presents the research objectives and questions, and introduces the instructional intervention implemented in this study. The chapter concludes with a summary of each of the chapters in this thesis.

1.2 RESEARCH PROBLEM

In their national strategy report on improving literacy and numeracy standards in the Irish primary education system, the Department of Education and Skills (DES, 2011) states that students learning both English and Irish should be able to speak, read and write in both languages. The DES (2011, p. 12) notes, however, that 'considerable weaknesses have been evident for some time in the teaching of Irish as a second language in schools' and that this has 'yielded less than satisfactory results' (Irish National Teachers' Organisation, 2004, p. 9), particularly in terms of students' speaking and listening skills (Harris et al., 2006). Chapter 3 elaborates upon the difficulties encountered by teachers in their Irish-language lessons.

Subject inspectors observed Irish being taught to a good standard in only half of the primary classrooms inspected (Department of Community, Rural and Gaeltacht Affairs, 2010). They also found that Irish was being taught through the medium of English in a third of primary classrooms and that students were unable to express themselves satisfactorily in nearly half of the lessons they observed (ibid). Even though the Primary School Curriculum (PSC) emphasises student enjoyment as a factor in achieving Irish learning outcomes (DES, 1999), students are not enjoying the experience of learning Irish in school (NCCA, 2005) and have asked for Irish lessons to be more modern, fun and relevant (Harris, 2005; Harris et al., 2006). Harris (2005) believes, however, that the problem associated with teaching and

learning Irish in English-medium primary schools is challenging but not ‘insurmountable’, and he calls for creative research-led solutions to enhance achievement and attitude in and towards the Irish language (p. 974).

1.3 AIM OF STUDY

The overall aim of this study is to explore the possibilities for enhancing the Irish-language learning experience in English-medium primary school classrooms through students collaboratively constructing digital artefacts via design-based learning activities.

This study promotes a constructionist and socio-constructivist approach to language learning where students co-create learning artefacts in the form of digital and animated stories aligned with curricular knowledge in and through the medium of Irish. Blumenfeld et al. (1991) define an artefact as a ‘sharable and critiquable externalization of students’ cognitive work in classrooms’ (p. 370). While students generate such artefacts, they construct knowledge – ‘the doing and the learning are inextricable’ (Blumenfeld et al., 1991, p. 372) and as they collaboratively construct artefacts, they ‘visibly display their learning’ (Stahl et al., 2006, p. 415). They engage in elaboration, questioning and explanation (Noss & Hoyles, 2006; VanderArk & Schneider, 2012) and their designed artefacts embody ‘concrete connections to the underlying domain concepts’ (Harris et al., 2009, p. 336).

Specifically, the researcher investigates the potential of digital storytelling and animation tools to enhance students’ attitudes towards and abilities in the Irish language, and their potential to foster a student-centred, collaborative, technology-enhanced, knowledge-construction learning environment. Such tools are communication technologies and involve multiple forms of digital media such as text, audio, graphics, animation and video (Eskicioglu & Kopec, 2003; Mayer, 2005). These technologies provide a good ‘medium for joint cooperation and construction of knowledge’ (Gros, 2002, p. 333). They are ideal pedagogical tools for language learning as they support the integration of all four language skills including reading, writing, speaking and listening, in an engaging and meaningful way.

Digital storytelling is often used to construct thought pieces on personal experiences (Hall & Long, 2012), making ‘autobiographical connections with the content’ (Rossiter & Garcia, 2010, p. 38). The researcher, however, employs it in this study as an approach to integrate language skills with corresponding multimedia skills around curricular content. Student-produced digital stories can describe ‘lived time’ (Bruner, 2004, p. 692) but in this study emphasis is placed on writing stories pertaining to specific curricular themes, demonstrating semantic (meaning), morphological (internal grammatical structure of words) and syntactical (arrangement of words in a sentence) use of the language in appropriate and meaningful ways. Such an approach integrates traditional literacies with digital ones (Sylvester & Greenidge, 2009), where students create paper-based storyboards during the composition process and engage with digital tools to enliven them. Digital literacies augment and enhance traditional literacies (Bogard & McMackin, 2012) and ‘bridge the connection’ between what students do at home and what they do in the classroom (Thesen & Kira-Soteriou, 2011, p. 100).

The researcher introduced animation to the digital storytelling process to maintain student engagement in language learning and to further enhance their digital skillset. The noun ‘animation’ is derived from the Latin verb ‘animare’, meaning ‘to give breath to’ or ‘to enliven’¹. It differs to video in that it shows the motion of simulated objects as opposed to real objects (Ainsworth, 2008). In her systematic review of the use of animation in education, Ainsworth (2008) notes the dearth of studies exploring the role of animation in social learning settings and how the majority of studies focus on cognitive accounts of learning with animations. She calls for more research in other areas such as linguistic, expressive, social, motivational and metacognitive aspects of animation. Hoban et al. (2007) also investigated the use of animation as an instructional tool in primary schools and found that while it was common in classrooms in terms of presentation, it was rarely used in a way that supported students being the ‘designers and creators of animations’ (p. 209).

¹<http://www.etymonline.com/index.php?term=animation>

1.4 RESEARCH OUTCOMES

By undertaking this research study the researcher hopes to:

- Promote an active, student-centred, collaborative, technology-enriched, knowledge-construction language-learning environment in the classroom;
- Explore the possibilities offered by student-created digital and animated stories in enhancing students' ability in the Irish language and improving their attitudes towards the language; and
- Explore the potential of this process to enhance digital fluency among students partaking in this process.

1.5 RESEARCH QUESTIONS

This research study addresses one overarching question and three subsidiary questions. The primary question posed by the researcher is:

- Can digital and animated storytelling be exploited as an instructional methodology to foster active, communicative, creative and authentic Irish-language learning experiences in the classroom?

The following three subsidiary research questions help to answer the primary question:

1. How effective are digital and animated storytelling techniques as pedagogical tools in Irish-language learning?
2. Can such an approach enhance students' attitude towards Irish?
3. Do students become more digitally fluent in the process?

1.6 RESEARCH RATIONALE

Primary schools in Ireland are categorised according to their language of instruction: English-medium and Irish-medium schools. Irish primary school students in both English-and Irish-medium schools perform at above average levels in English reading, mathematics and science (OECD, 2015). When it comes to learning Irish, Irish-medium schools experience higher levels of fluency due to the language immersion process compared to English-medium schools, where students study Irish as a second language (Harris et al., 2006). The researcher has specifically focused on English-medium primary schools in this study as students in this type of school

make less satisfactory progress in Irish (Harris, 1982). In addition, the researcher focused on primary school students as opposed to secondary students as state examinations influence the latter group's motivations to engage with the language, and examination preparation plays an important role in both teaching and learning the Irish language at second level.

Harris et al. (2006) report long-term performance in Irish listening, speaking and reading skills of second, fourth and sixth class students in both English-and-Irish-medium primary schools between 1985 and 2002. Across two different curricula, audio-visual and communicative, they found a substantial decline in Irish listening and speaking achievements in English-medium schools. Their data also revealed that 21% of parents found their children had problems reading Irish in their final year compared to 8% of parents who noted a problem with their children's English reading. They proffer several possibilities for this decline, including unsuitable teaching resources, a reduction of core time spent on Irish as a second language and a reduction in Irish-medium teaching.

McCoy et al. (2012) investigated data from the Growing Up in Ireland (GUI) study in terms of teaching and learning in primary schools. The GUI study is a national longitudinal study of 8,568 nine-year-old children conducted between 2007 and 2008 (Devitt et al., 2016). It revealed that English-medium primary school students' attitudes were least positive towards Irish compared to English reading and Mathematics, with only a fifth of children always liking Irish (McCoy et al., 2012). In fact, 36% of students had a less favourable attitude towards Irish compared to 17% for Mathematics and 9% for English (Devitt et al., 2016). Fortunately, the majority of English-medium primary school students are well disposed towards the Irish language, but lack the motivation to learn it (Harris & Murtagh, 1999; Markey, 2007; Devitt et al., 2016).

The DES (2011) attributes the problems associated with Irish-language learning to the 'implementation of the Irish language curriculum' (p. 50). Data from the GUI study suggest that Irish is still taught in a traditional way (McCoy et al., 2012). In fact, traditional instruction is still the global dominant approach in most classrooms today (Kozma, 2011; Petkov & Rogers, 2011). This form of instruction involves knowledge transmission from teachers to students via a fixed sequence of curricular

content (Brown, 1992; Dede, 2000; Kozma, 2011; Sawyer, 2008; Scardamalia & Bereiter, 2006; Wiske et al., 2001). Emphasis is placed on rote learning (Goldman, 2007), whole-class learning (Knobel & Lankshear, 2006), choral recitation (Mascolo, 2009), superficial coverage (Kozma, 2011; McCombs, 2000; Wiske et al., 2001) and didactic instructional practices (Bransford et al., 2006).

The teacher participating in this study's instructional intervention states:

It's just not working for me, or for a lot of teachers I know. This sounds terrible, but Irish classes are very dead. They're very lack lustre.... You're almost forcing them into forming sentences, there's kind of a lack of spontaneity there...you're feeding them bits, whereas they should be motivated to figure it out themselves, if they can...but trying to get them to use spontaneous independent Irish is actually very hard...I feel it's not working...I'd like to get more enjoyment, more satisfaction, more engagement. I'd like to get a greater sense that the kids are taking in things, that it's practical, and that they're remembering them (Interview 1).

Another consideration is technology use in the Irish-language classroom. Kozma (2011) maintains that it is still not a 'central component of everyday classroom practice in schools' (p. 34). In fact, the INTO (2011) found that many primary school teachers are still uncomfortable using digital tools in their classrooms. Kozma (2011) refers to a study conducted in 2006 involving 27 European countries, which revealed that even though 74% of teachers used a computer in class, 63% of them used it to simply deliver learning material. Knobel & Lankshear (2006) highlight a recurring theme in educational technology research, where literacy tasks involve new technologies being 'tacked on', perpetuating traditional instruction (p. 55). For technology to be effective in the classroom, it must be pedagogically integrated (Barber et al., 2012; Dede, 2000; Ertmer et al., 2010; Higgins et al., 2012; Littlejohn et al., 2012; Luckin, 2008; McCombs, 2000; VanderArk & Schneider, 2012). When employed in this way, it can extend and deepen students' learning opportunities (Barber et al., 2012) and it can connect the student's learning day both inside and outside of school (Barber et al., 2012; Volman, 2005).

Finally, few opportunities exist to use Irish authentically outside of the classroom (DES, 2007a; Harris & Murtagh, 1999; Devitt et al., 2016). This study involves an approach to establish such a context within the classroom, reducing students' dependence on 'immediate reinforcement outside the classroom' (Ó Laoire & Harris, 2006, p. 16). This can be achieved through students collaboratively learning in an authentic meaningful way as opposed to engaging in decontextualised learning of skills in isolation (Sawyer, 2008; Applefield et al., 2001). Students are stimulated to discover language as they need it from resources around them (Sawyer, 2008). They are encouraged to co-construct artefacts, reinforcing and displaying their learning (Papert, 1993; Stahl et al., 2006) and teaching is customised around students' needs through effective instructional and software scaffolding (Sawyer, 2008).

The researcher believes that the TALES (Technology, Activity, Language, Engagement, Story) model, designed and employed in this study, is one way to enhance students' experience of Irish-language learning. TALES features a constructionist and socio-constructivist approach to language learning. It encompasses five design themes arising from the researcher's theoretical framework, her comprehensive literature review and her empirical research.

1.7 BIOGRAPHICAL MOTIVATION

As this section recounts my biographical and professional background, I have decided to write this passage in first person. Growing up in an all-Irish speaking community, Gaeltacht Chorca Dhuibhne, in the most westerly point of Ireland, Irish was my first language. I am deeply passionate about the Irish language, a passion instilled within me by my family. My grandfather was a storyteller, known in Irish as a seanchaí, and many scholars frequented his home to learn his rich and eloquent Irish. His children later took the mantle penning stoic memories of childhood, immigration and homecomings.

I attended all-Irish primary and secondary schools. Studying Irish at third-level provided me with the opportunity to delve deeper into the history and literature associated with the language. I undertook a higher diploma in Computer Science thereafter and began teaching oral Irish to university students. My passion extended to programming languages and their ability to bring syntax to life. While undertaking

an MSc in Multimedia Technologies, I designed a computer application to live-stream Fleadh Cheoil na Mumhan², showcasing the richness of our Irish culture. I wrote the programme in Irish using an XML script, demonstrating that Irish was as valuable as any other language and not one to be confined to the vaults of lore. I later completed a second higher diploma and masters in Computing in Education, combining my knowledge and passion for language, pedagogy and technology. As part of my final dissertation, I designed an online application to teach Irish, providing customisable feedback to students through a backend PHP/SQL server.

To date, I have taught Irish and multimedia, educational and translation technologies through the medium of Irish at tertiary level. In the course of my work and travel, I have always wondered and worried about the prevailing negative attitude conveyed by many in terms of learning Irish at school and why so many incoming students possessed such weak oral and comprehension skills. This study is my opportunity to explore this matter further and to investigate new, authentic and stimulating approaches to teaching and learning Irish.

1.8 INSTRUCTIONAL INTERVENTION

This study took place in the setting of a third-grade classroom in an English-medium primary school in Cork over the course of one academic year between September 2014 and May 2015. The researcher first conducted preliminary research prior to the intervention phase by reviewing the literature around Irish-language learning and teaching at primary level, by developing a theoretical framework for her study, and by engaging in a classroom observation phase. Together with the teacher, the researcher designed and implemented three iterative design cycles in their classroom (Bannan, 2007; McKenney & Reeves, 2012; Plomp, 2007; van den Akker, 2007). During this time, students created a series of digital and animated stories around curricular objectives for Irish. These cycles are explored in more detail in chapters 7 through 9.

² A traditional musical event and festival hosting all-Ireland championship competitions in various categories of musical instruments, dancing, singing and storytelling.

This study is concerned with learning language-in-use (Bruner, 1981, p. 155) as opposed to learning by rote. Emphasis is placed on learning Irish in a meaningful and authentic way; one that engages students and motivates them to want to learn in order to communicate and share their stories with others. Students created storyboards (a textual and pictorial paper representation), penning scenes and positioning them in coherent sequences (Hoban & Nielsen, 2010). As they completed this activity, they reflected upon language learning concepts and engaged with oral, aural, written and reading skills. Digital creation provided the students with further opportunity to engage and reflect upon their learning. In this way, meaning is multiplied as it is 'transferred from one representation to the next and enhanced with each representation having its own affordances that make the students think about the concept' (Hoban & Nielsen, 2010, p. 35). Thus, there is a progression of conceptual knowledge and ideas from one representation to the next (Hoban & Nielsen, 2010).

1.9 SUMMARY OF CHAPTERS

The rationale for undertaking this research, along with the aims, objectives and research questions guiding the study have been outlined in this introductory chapter, as well as the researcher's biographical motivation for this study and the context in which the study unfolded.

Chapter 2, Theoretical Framework, outlines the theoretical framework undergirding the design of the learning environment promoted in this empirical study, namely socio-constructivist and constructionist learning theories. The researcher also discusses the Zone of Proximal Development and highlights the role of scaffolding within her language learning environment.

Chapter 3, The Irish Language in Education, describes the status of the Irish language and its position within the primary school education system. It also discusses traditional and constructivist pedagogical approaches adopted in language classrooms.

Chapter 4, Literature Review, frames the major concepts emanating from the researcher's overall aim and approach to enhancing the Irish-language learning experience in English-medium primary school classrooms through collaborative construction of digital artefacts via design-based learning activities. These include an investigation into technology integration in the classroom and sustained engagement through technology-enhanced learning. The researcher also explores the potential of

several constructionist learning tools in order to promote a technology-enhanced collaborative language-learning environment.

Chapter 5, Research Methodology, outlines the process of inquiry undertaken in this study and the conceptual framework that underpins it in terms of epistemology and ontology. It also discusses the research approaches and methods employed in collecting and analysing data. This study draws on ethnographic approaches, while design-based research (DBR) guided the instructional intervention using mixed methods to gather qualitative and quantitative data from teachers and students. DBR has become a popular form of research for those interested in producing change in the classroom and especially so when technology is used to support learning (Sandoval, 2004). Norris & Ortega (2000) conducted a meta-analysis of 49 experimental and quasi-experimental studies investigating the effectiveness of second language instruction. They call for a change of focus from experimental and quasi-experimental research methods to better inform language pedagogy (Norris & Ortega, 2000). Flewitt et al. (2005) also call for more ‘participatory, democratic, multimodal and arts-based modes of research inquiry’ within the field of literacy research (p. 2). The researcher believes that DBR is a worthy alternative approach as it provides ‘opportunities for researchers to deeply understand problems of practice’ (Joseph, 2004, p. 241), whilst being informed by theory in order to produce real change (Barab & Squire, 2004). In fact, Reeves et al. (2005) call for greater use of DBR to enhance the ‘quality and usefulness of research in technologies in education (p. 96).

Chapter 6, Overview of Intervention, depicts an overview of the empirical research conducted during the intervention, articulating the DBR process and demonstrating how learning activities were designed and developed to enhance the Irish-language learning experience. The researcher also introduces her TALEs model which frames and informs the design and development of her instructional intervention in the language classroom. TALEs encompasses five main design themes emerging from her literature review discussed in Chapter 4 and her theoretical framework outlined in Chapter 2. These design themes include: (1) Technology; (2) Activity; (3) Language Learning; (4) Engagement and (5) Story.

Chapters 7 – 9, Design Cycles 1, 2 & 3, portray learning in context in each of the three design cycles and reveal the ‘systematic design and study of instructional strategies and tools’ undertaken by the researcher and class teacher (The Design-Based Research Collective, 2003, p. 5). The activity of students jointly creating

learning artefacts steered the process of the intervention. The data derived from research products such as digital and animated stories, analytic assessment rubrics, pre-and-post questionnaires, qualitative feedback, pre-and-post language tests, and audio and video observations formed the subject of analysis. Each design cycle evolves the concept of TALEs to create more effective and educational learning experiences for students and results in a repurposable design model (Hall et al., 2016), which can be adopted and adapted by Irish-language teachers, and language teachers in general, to support a more active and communicative approach to language learning.

Chapter 10, Findings and Discussion, describes the researcher's findings in terms of students' language ability and attitude towards the language. It also triangulates and reveals other findings from her interview and questionnaire data.

Chapter 11, Conclusion and Recommendations, provides an overview of the research contribution and demonstrates how the design principles encompassed within TALEs contributed to an enhanced Irish-language learning experience overall. It also offers concluding remarks and recommendations for further research.

2 CHAPTER TWO: THEORETICAL FRAMEWORK

2.1 INTRODUCTION

In this chapter, the researcher outlines the theoretical framework underpinning the design of the student-centred, collaborative, technology-enhanced, knowledge-construction language-learning environment implemented in this empirical study. She first describes the overarching learning theories undergirding the instructional intervention and then discusses design-based learning approaches in relation to technology-enhanced learning. She discusses the Zone of Proximal Development (ZPD) in relation to collaborative learning and highlights the role of scaffolded instruction within this approach.

2.2 UNDERLYING LEARNING THEORIES

There have been many paradigm shifts in relation to theories of learning down through the years (Applefield et al., 2001). The researcher briefly describes behaviourism as a background to traditional instruction and discusses constructivism as a stepping-stone to socio-constructivism and constructionism – two learning theories that informed language-learning activities in her instructional intervention.

2.2.1 BEHAVIOURISM AND CONSTRUCTIVISM

Behaviourism underpins traditional learning in the classroom. It focuses on a stimulus-response action involving reinforcement and repetition, resulting in a desired behaviour being achieved (Eskicioglu & Kopec, 2003; Mattingly et al., 2008). Behaviourists encourage the rote learning of isolated and decontextualised constructs (Gros, 2002) through knowledge transmission, memorisation and repetition (Applefield et al., 2001; Goldman, 2007). A student who attempts to memorise content in this way is often unable to apply such knowledge outside of the classroom (Gredler, 2009). This standard model of schooling was ‘designed to prepare students for the industrial age’ but is no longer suitable for the knowledge economy in which we live (Sawyer, 2008, p. 1). Constructivists, on the other hand,

believe that knowledge ‘cannot be “transmitted” or “conveyed ready made” to another person’ (Papert, 1993a, p. 142), but rather students actively build upon and transform knowledge (Gredler, 2009; Shaw, 1996).

Piaget and Vygotsky pioneered constructivism in the 1930s, emphasising knowledge construction over knowledge transmission (Applefield et al., 2001; Shaw, 1996). Piaget believed that to know the world was to be able to 'organize it in terms of existing knowledge' and that learning could not happen acontextually (Mascolo, 2009, p. 5), nor was it possible ‘to learn anything totally anew’ as new knowledge develops out of existing knowledge (ibid, p. 6). Papert (1993b) describes Piaget’s assimilation–accommodation process of constructivist learning as one where the student absorbs the new into the old in a process called assimilation, where he ‘constructs his knowledge in the course of actively working with it’ (p. 120). Ackermann (1996) views this balance between stability and change in learning as students assimilating ‘the world to their current knowledge’ (p. 26). The cost of accommodation is ‘momentary loss of control, or disequilibrium’ (Ackermann, 1996, p. 28). The result of this intersection between new and old knowledge is the ‘modifying of prior patterns of knowledge or the creation of new patterns’ (Gros, 2002, p. 328).

While Piaget’s focus was on individual learning and the 'relationship between a person and his/her environment’ (Gros, 2002, p. 328), Vygotsky was more concerned with social learning undergirded by socio-constructivism. Goldman (2007) describes socio-constructivism as ‘knowledge moved from the individual mind to the collaborative, social, and cultural worlds within which individuals participate in knowledge creation’ (p. 23). Applefield et al. (2001) believe that dialogue is the ‘catalyst for knowledge acquisition’ through interaction; through questioning, explaining and challenging one another; and through timely support and feedback (p. 38). Learning ‘is much less about acquiring information or submitting to other people’s ideas or values, than it is about putting one’s own words to the world, or finding one’s own voice’ (Ackermann, 2002, p. 2). Socio-constructivists believe that meaningful learning occurs in a learning environment that involves authentic real world tasks, where ‘oversimplification of the task and instruction’ is avoided and where ‘collaborative knowledge construction through social negotiation’ is supported (Applefield et al., 2001, p. 49).

2.2.2 CONSTRUCTIONISM

Constructionism bridges socio-constructivist and constructivist viewpoints as it develops ‘shared constructive activity in the social setting’ (Shaw, 1996, p. 179). While constructionism focuses on knowledge construction (Goldman, 2007), it is also concerned with making ideas and learning constructs more tangible and concrete (Ackermann, 1996). It was first advocated by Papert (1990), who distinguishes between constructivism and constructionism in the following statement:

The word with the v expresses the theory that knowledge is built by the learner, not supplied by the teacher. The word with the n expresses the further idea that this happens especially felicitously when the learner is engaged in the construction of something external or at least shareable...a sand castle, a machine, a computer program, a book. This leads us to a model using a cycle of internalization of what is outside, then externalization of what is inside and so on (p. 3).

Constructionism is based on the idea that students learn best while creating things, especially objects that can be shared with others (Evard, 1996; Shaw, 1996). The student actively constructs knowledge (Kafai and Resnick, 1996) as she engages with her surrounding environment (Ackermann, 1996) in ‘hands-on explorations that fuel the constructive process’ (Ackermann, 2002, p. 1). Learning becomes more effective when students are ‘engaged in constructing personally meaningful projects; learning by doing is better than learning by being told’ (Bruckman and Resnick, 1996, p. 208).

2.3 THEORIES OF LEARNING INFORMING THE INSTRUCTIONAL INTERVENTION

As aforementioned, the researcher investigates the potential of digital storytelling and animation tools to enhance students’ experience in the Irish-language classroom and to foster a student-centred, collaborative, technology-enhanced, knowledge-construction learning environment. Student-centred pedagogy is rooted in constructivism where students actively ‘construct their understandings through their actions and experiences on the world’ (Mascolo, 2009, p. 3). They advance ‘their cognitive structures by revising and creating new understandings out of existing ones’ through discovery-oriented learning activities (Applefield et al., 2001, p. 37).

Learning must be significant to students (Gros, 2002) and must proceed from the ‘natural need to develop understanding’ in order for students to complete tasks (Applefield et al., 2001, p. 40).

Socio-constructivism extends this type of learning to incorporate a social element through collaborative and task-based learning approaches, approaches implemented in this intervention (Applefield et al., 2001). Communication and negotiation are fundamental to this type of learning (Gros, 2002) and deeper understanding is achieved through social interactions and meaningful learning contexts (Matthews, 2003). Students need to be challenged by ‘ideas and experiences that generate inner cognitive conflict or disequilibrium’ (Gros, 2002, p. 339). In order to foster collaborative learning in the classroom, the researcher employs scaffolded instructional approaches to guide students' progress through their individual Zones of Proximal Development. Constructionism aids socio-constructivist learning in the classroom as it supports learning that is active, social and student-centred (Martinez & Stager, 2013). Scardamalia & Bereiter (2006) refer to active learning as students engaging in interest-driven activities. Technology can bring the idea of active learning to life, constructionist tools in particular, as students learn by doing (Luckin et al., 2012) and results in the creation of learning artefacts, which are external representations of students’ constructed knowledge (Krajcik & Blumenfeld, 2006). The researcher employs design-based learning and constructionist approaches to implement active, technology-enhanced learning in the classroom. The following sections describe the learning theories underpinning technology-enhanced learning and collaborative learning in more detail.

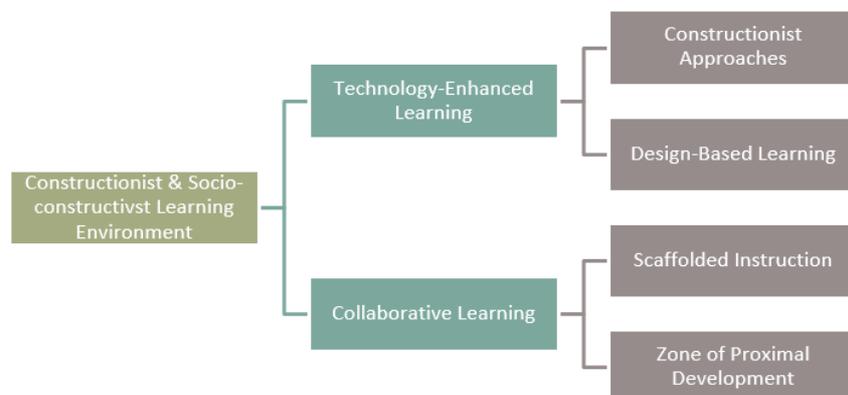


Figure 2.1: Learning Theories Undergirding Instructional Intervention

2.3.1 TECHNOLOGY-ENHANCED LEARNING

Papert (2003) attaches 'special importance to the role of constructions in the world as a support for those in the head' (p. 143). Externalising and presenting content through reconstruction deepens learning (Gredler, 2009; Luckin et al., 2012). This 'explicit representation in the artifact' can provide 'concrete evidence of the work that can enable later reflection' (Reiser, 2004, p. 289). Papert (1993a) uses the metaphor of bricolage for this type of learning where students make, fix and improve 'mental constructions' (p. 144). Goldman (2007) describes bricolage as the process of tinkering with an object, one created by a student, which has the ability to change that student's thinking.

According to Papert (1993), the goal is to 'teach in such a way as to produce the most learning for the least teaching' (p. 139) by encouraging students to learn on their own while being guided by the teacher (Papert, 1993). Papert (1993) believes that the kind of knowledge students require is the 'knowledge that will help them get more knowledge' (p. 139). As Sherin et al. (2004) explains, the activity is 'not structured as a lesson in which the teacher teaches one new thing, then another, then another. Rather, the child works on a given task, and the adult intervenes only when the child needs assistance' (p. 389). A constructionist teacher will try to give the student the 'freedom to demand knowledge when he is most receptive to it' (Gargarian, 1996, p. 149). The student accomplishes more in this way (Reiser, 2004). Students use technology to support their learning and construct knowledge through building digital artefacts (Urrea, 2002), embodying ideas related to the topic of inquiry (Martin, 1996). They refer to facts and concepts as they need them (ibid) and their learning artefacts can 'be shown, discussed, examined, probed, and admired' (Papert, 1993a, p. 142).

Kafai & Resnick (1996, p. 4) highlight the 'strong connection between design and learning' in constructionism through the type of activities that involve 'making, building, or programming' in a 'learning by mindful doing' way (Quintana et al., 2006, p. 122). Gargarian (1996) describes design activities as 'mind-stretching' (p. 141), where students adopt the 'role of producers rather than consumers' (Kafai, 1996a, p. 97) and 'make things that represent their thinking about complex problems' (Goldman, 2007, p. 25). Papert (1993a) describes learning by design as the integration of technology with curricular learning. Students engaging in design

activities co-construct knowledge through ‘exploration, experimentation, discussion, and reflection’ (Resnick, 2002, p. 33). They playfully create personally meaningful digital artefacts in collaboration with their peers (Resnick, 2014; Stahl et al., 2006; Resnick, 2002). They learn ‘about design by managing the projects while, through design, they learn about academic subjects’ (Kafai, 1996b, p. 72). This type of learning encourages conceptual change (Mascolo, 2009). diSessa (2006) defines conceptual change as a process where students ‘build new ideas in the context of old ones; hence, the emphasis on “change” rather than on simple acquisition’ (p. 265). Design activities focus on the process ‘which is only partially reflected in the product’ (Kafai, 1996b, p. 73). The process of ‘meaning-construction’ is more important than the product (Kafai & Resnick, 1996. p. 4) and ‘even though students may not achieve a well-rounded final product, learning can take place because of the involvement over time’ (Kafai, 1996b, p. 73).

2.3.2 COLLABORATIVE LEARNING

This section describes two important learning constructs grounded in socio-constructivist learning approaches – the Zone of Proximal Development (ZPD) and Scaffolding – and their role in promoting an active collaborative language-learning environment.

2.3.2.1 ZONE OF PROXIMAL DEVELOPMENT

Vygotsky highlights the importance of collaborative learning through the concept of the ZPD (Gros, 2002), where the teacher assists the student through questioning, through initiation or through modelling (Vygotsky, 1978). He defines the ZPD as 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, 1978, p. 86).

The construct of the ZPD initially developed out of a laboratory experiment where a teacher revisited his student’s initial answers in an intelligence test and later probed the student into re-answering some of the easier questions correctly (Gredler, 2012; Shayer, 2003). Through this assistance, the student performed better in the test compared to completing it independently (ibid). Vygotsky (1978) states that ‘what

is in the zone of proximal development today will be the actual developmental level tomorrow – that is, what a child can do with assistance today she will be able to do by herself tomorrow’ (p. 87). Applefield et al. (2001) note that when students ‘work on tasks that cannot be accomplished alone but can be successfully completed with the assistance of a person competent in the task, they are said to be working within their zones of proximal development’ (p. 39). In this situation, knowledge is mutually built through interaction where ‘learners both refine their own meanings and help others find meaning’ (Applefield et al., 2001, p. 38).

2.3.2.2 SCAFFOLDING

The concept of ZPD has resulted in the development of a pedagogical approach called scaffolding (Gros, 2002). Scaffolding provided by a teacher, for example, can help a student ‘perform at a desirable level of proficiency on that task, which is known to be unachievable without such scaffolding’ (Pea, 2004, p. 443). Scaffolding develops the ZPD of each individual student, where the student’s intellectual functions are maturing, but have not yet matured (Gredler, 2012). While there is an emphasis on individual learning, scaffolding occurs through collaboration with others (Shaw, 1996).

Scaffolding was first defined by Wood et al. (1976) as a form of adult assistance ‘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’ (p. 90). They conducted an empirical study into scaffolding processes in a laboratory experiment involving a tutor and a child, where the child had to construct a wooden puzzle (Wood et al., 1976). The tutor employed a scaffolding process, controlling certain elements of the task that were initially beyond the child’s capacity, thus permitting him to concentrate upon and complete only those elements that were within his range of competence (ibid). Wood et al. (1976, p. 90) claim that ‘comprehension of the solution must precede production’, where the student must reach a new understanding in order to accomplish a task unassisted (Stone, 1998).

Stone (1998) reveals that the scaffolding metaphor made no reference to Vygotsky's ZPD and that it was Cazden (1979, p. 17) who first made this connection explicit, when he stated that 'helping learners perform in their ZPD and extending their actual developmental level is the essence of scaffolding'. The notion of scaffolding has evolved from a one-to-one interaction between an expert adult and child (Sherin et al., 2004) to include 'more knowledgeable peers' (Stone, 1998, p. 344) and technological tools, paper-based artefacts and learning activities (Davis & Miyake, 2004). Tabak (2004) believes that this synergy of scaffolds triangulates each scaffold's strength and are more powerful to learning together than apart as they 'interact and work in concert to guide a single performance of a task or goal' (p. 318). Each scaffold addresses and supports the 'same learning need' (Tabak, 2004, p. 305). This scaffolding support is assumed to be temporary, however, and is later withdrawn as students demonstrate more sophisticated activity (Stone, 1998). Cazden (1979) describes this process of fading as a scaffold that 'self-destructs gradually as the need lessens' (p. 11). As students learn the skill, they need less support and 'scaffolding can be attenuated and ultimately removed' (Mascolo, 2009, p. 8).

Langer & Applebee (1986) remind us how Vygotsky viewed language learning as a 'social and communicative activity' (p. 172). Approaches to language learning are 'initially socially mediated' and then eventually internalised, becoming 'part of the repertoire of the individual' (Langer & Applebee, 1986, p. 173). Cazden (1979) relates Vygotsky's concept of ZPD to language learning when he states that it is 'important to distinguish between help that somehow gets a child to produce the right answer, and help from which the child might learn how to answer similar questions in the future' (p. 18). He emphasises that only the latter is of educational interest (Cazden, 1979, p. 18), echoing Papert's (1993) belief that the best type of knowledge is that which begets more knowledge. This scaffolding process will eventually lead the student to carry out a similar task independently without external support (Tabak, 2004). The overall purpose of scaffolding is 'that the support not only assists learners in accomplishing tasks but also enables them to learn from the experience', otherwise the 'assistance will have been local to that instance of scaffolding [and] will not have provided support for learning' (Reiser, 2004, p. 275).

Wood et al. (1976) identify six features pertaining to the scaffolding process:

1. Recruiting student interest (Wood et al., 1976);
2. Reducing the degrees of freedom, or steps in a task, in order to simplify it (ibid), resulting in the task becoming more manageable for students (Reiser, 2004; Tabak, 2004);
3. Maintaining direction through motivation and focusing the student's attention towards task achievement (Pea, 2004);
4. Highlighting relevant features of the learning task (Wood et al., 1976);
5. Reducing frustration (ibid);
6. Demonstrating and modelling more advanced solutions through action and dialogue (ibid);

In her review of literature on scaffolded instruction in literacy, Palincsar (1986) believes that scaffolding 'embodies the best of teaching practices', where 'teacher attention is directed to the profile of the learner, to the profile of the skill to be learned, and to matching the skills of learners to the way new skills are presented to them' (p. 95). Teachers design language learning activities with their students in mind, determining the difficulties that each task is likely to pose for particular students, selecting strategies to overcome such difficulties, and structuring the activity 'as a whole to make those strategies explicit (through questioning and modelling) at appropriate places in the task sequence' (Applebee & Langer, 1983, p. 169). In language learning, dialogue promotes 'the kinds of opportunities necessary for the teacher to provide scaffolded instruction' (Palincsar, 1986, p. 73). Palincsar (1998) reminds us that within a social-constructivist approach to learning, 'knowledge is a fruit of the constructive process of bringing personal meaning to experience' (p. 370) and that scaffolding 'focuses our attention on the social nature of this construction' (Palincsar, 1998, p. 370). Meaning is negotiated between group members and 'framed with the use of the construct zone of proximal development' (ibid).

2.4 CONCLUDING REMARKS

This chapter encapsulates the theoretical foundations of this research study, namely constructionist and socio-constructivist learning theories and how they influenced and guided the pedagogical activities implemented in this study's instructional intervention. Students are encouraged to 'actively contribute to the construction of

their knowledge, by transforming their world' (Ackermann, 2004, p. 15). In her endeavour to enhance students' attitudes towards and abilities in the Irish language using constructionist tools, the researcher aims to foster a student-centred, collaborative, technology-enhanced, knowledge-construction learning environment. Technology-enhanced learning is facilitated by constructionist and design-based learning approaches, while collaborative learning is enabled through the Zone of Proximal Development and scaffolding approaches.

A student cannot create his ZPD by himself; he needs a 'more expert individual to bridge the gap between his current developmental level and his proximal level of development' (Mascolo, 2009, p. 7). A learning environment designed with this in mind, one that promotes social interaction within the student's ZPD through instructional and peer scaffolding, and through the collaborative creation of external learning artefacts, will enable deeper and more effective learning. As aforementioned, this study culminates in an adoptable and adaptable design model (Hall et al., 2016) called TALES, which can be employed and repurposed by other language teachers to support a more active, communicative and creative approach in their classrooms. This model is elaborated upon in chapter 6, Overview of Intervention. The following chapters will now explore the position of the Irish language within the primary school education system, approaches to language learning, and technology integration in the classroom.

3 CHAPTER THREE: THE IRISH LANGUAGE

3.1 INTRODUCTION

This chapter begins with an overview of the Irish language in education. It then describes traditional and constructivist pedagogical approaches adopted in language classrooms.

3.2 THE IRISH LANGUAGE

This section conveys an overview of the Irish language in terms of its status nationally and internationally, and its position within the primary school education system. It also provides a description of the Irish-language curriculum in English-medium primary schools and reports on the various studies and subject inspections conducted since its first implementation.

3.2.1 THE IRISH LINGUISTIC LANDSCAPE

Bilingualism is a significant feature of the education system in Ireland as children learn both English and Irish from the moment they enter primary school (DES, 1999; DES, 2011; INTO, 2011; NCCA, 1999). The Irish linguistic landscape has evolved over the years, however, as there are now speakers of at least 60 different languages registered in schools today (INTO, 2011) including Vietnamese, Polish, Moldovan, Chinese, Lithuanian, Romanian, Arabic, Albanian, Yoruba and Russian (RIA, 2011). In fact, according to the 2009 National Assessments of Mathematics and English Reading, 10% of students in second class do not speak English or Irish at home (Shiel et al., 2012).

3.2.2 THE IRISH LANGUAGE TODAY

According to Article 8 of the Irish Constitution, Ireland is a bilingual State, in which Irish is the first official language and English is the second official language (Bunreacht na hÉireann, 1937). English is the dominant majority language, however (DES, 2006; Fiontar, 2009; Hickey & Stenson, 2011; RIA, 2011), but most of the population (89%) is favourably disposed towards the Irish language (Department of Community, Rural and Gaeltacht Affairs, 2010; Devitt et al., 2016). The Official Languages Act 2003 provides a legislative framework for the provision of public services in Irish (Walsh & Cassidy, 2003; Rialtas na hÉireann, 2006). It has been recognised as an official and working language of the European Union since 2007 (Department of Community, Rural and Gaeltacht Affairs, 2010; Fiontar, 2009; Devitt et al., 2016). Irish is one of the oldest spoken literary languages in Europe (Department of Community, Rural and Gaeltacht Affairs, 2010; Fiontar, 2009), with oral Irish and Irish literature being taught in more than 50 universities worldwide (Fiontar, 2009).

Nonetheless, UNESCO has classified Irish as a vulnerable language (Department of Community, Rural and Gaeltacht Affairs, 2010). According to Census 2016, 40% of the population can speak Irish, but only 2% of the population speaks Irish on a daily basis, while 13% speaks Irish on a daily basis within the education system³. This reinforces the important role the education system plays in terms of transmitting Irish from one generation to the next (Devitt et al., 2016; Harris, 2005; Harris, 2009; Ó Laoire, 2004; Rialtas na hÉireann, 2006). In fact, Irish has been a compulsory subject since the foundation of the State in 1922 (INTO, 2004; NCCA, 2008), when the Irish government first began to pursue a bilingual policy to revive the Irish language (Harris, 2005; INTO, 2004). Furthermore, The Education Act, 1998 provides official support for Irish through its contribution to the extension of bilingualism in Ireland (DES, 2006).

3

http://www.cso.ie/en/media/csoie/releasespublications/documents/population/2017/7_The_Irish_language.pdf

English-medium primary schools are particularly important to the maintenance and revitalisation effort due to its majority holding of 90% of primary schools, and any successful initiative can affect large numbers of students and thus contribute to the language-revival movement (Harris & Murtagh, 1999; Harris, 2005; Harris, 2007; Harris, 2009). A 20-year strategy to safeguard the future of the Irish language has also been published (Department of Community, Rural and Gaeltacht Affairs, 2010). Its aim is to increase the number of citizens bilingual in both Irish and English (ibid). The education system is listed as one of nine actions and plays a critical role in enhancing this linguistic capacity of the country (Devitt et al., 2016; Ó Duibhir & Cummins, 2012; Fiontar, 2009).

3.2.3 THE IRISH PRIMARY SCHOOL CONTEXT

Several agencies play key roles in the education system in Ireland. The Department of Education and Skills⁴ (DES) provides high-quality education enabling students to achieve their full potential and participate fully as members of society (DES, 2006; OECD, 2015). The National Council for Curriculum and Assessment (NCCA) is a statutory body operating under the guidance of the DES (DES, 2006). It prepares the national curricula, syllabi and guidelines for teachers, and advises the DES on matters of curriculum and assessment (DES, 2006; OECD, 2015). The Inspectorate within the DES supports, advises and evaluates the quality and effectiveness of educational provision (DES, 2006).

There are approximately 3,100 primary schools in Ireland (DES, 2013) accommodating 526,422 students and 32,175 teachers (DES, 2013). Three different primary school contexts exist based on the language of instruction and geographical location (DES, 1999; Harris, 2009). Irish is the medium of instruction⁵ in Gaelscoileanna⁶ and Scoileanna Gaeltachta⁷. It is important to note that less than 10% of schools teach through the medium of Irish (INTO, 2011). There are approximately 124 primary schools in the Gaeltacht areas accommodating 9,325

⁴ A department of the Irish state with responsibility for education and training.

⁵ Often referred to as T1, which is short for Teanga 1, meaning Language 1.

⁶ Gaelscoileanna are all-Irish schools that operate an immersion approach (Harris & Ó Duibhir, 2011, p. 41)

⁷ Schools located in Irish-speaking communities.

students and 144 Gaelscoil outside of the Gaeltacht regions with approximately 35,994 students⁸. English is the medium of instruction in mainstream schools⁹, which hold the great majority (NCCA, 2013) and teach Irish as a curricular subject (Harris, 2009). The 1999 Primary School Curriculum (PSC) also encourages students and teachers to use Irish during routine classroom procedures (DES, 2007a; Harris & Murtagh, 1999). It is interesting to note that test scores in English reading and comprehension tasks are higher than those in Irish, even for those students schooled through Irish, reflecting the ‘societal dominance of the English language’ (INTO, 2011, p. 23).

3.2.4 THE PRIMARY SCHOOL CURRICULUM

The current curriculum, Primary School Curriculum (Curaclam na Bunscoile), was launched in 1999. Primary education in Ireland consists of eight years of schooling across four class levels: junior and senior infants; first and second classes; third and fourth; and fifth and sixth (DES, 2006). Language is one of seven areas of the curriculum comprising of 12 subjects, including Irish (Grayson et al., 2014; Ó Duibhir & Cummins, 2012). The study of a foreign language is not compulsory in the Primary School Curriculum (DES, 2007). A pilot programme called the Modern Languages in Primary Schools Initiative (MLPSI) was implemented between 2008 and 2011, however, where 15% of primary schools (488) taught a foreign language to sixth-class students (Devitt et al., 2016; NCCA, 2008). The PSC promotes active, collaborative and discovery learning (DES, 1999) and encourages the development of interpersonal, communication, critical thinking and creativity skills (ibid). The PSC also endorses the use of technology to enhance learning across all subjects (ibid).

⁸ <http://www.gaelscoileanna.ie/en/about/statistics/>

⁹ Often referred to as T2, which is short for Teanga 2, meaning Language 2.

3.2.4.1 THE IRISH CURRICULUM

A behaviourist approach to Irish-language instruction had been adopted between the 1970s and 1990s (Harris, 2009). A linguistic curriculum called Nuachúrsaí (Harris, 2009) emphasised an audio-visual approach¹⁰ to language learning (Harris & Murtagh, 1999). It was deemed unsuitable, however, due to its level of difficulty, dated learning material and the teaching approach it advocated (Harris, 2007; Harris, 2009; Ó Riagáin, 1986). In fact, Harris (2009) believes that this curriculum was responsible for the decline in Irish language proficiency during that time.

The current curriculum (*Curaclam na Gaeilge*) is predicated upon a socio-constructivist learning theory (Ó Duibhir & Cummins, 2012). Its approach is a communicative one, where the focus of instruction is on meaning (Harris & Murtagh, 1999). It was introduced in 1999 and fully implemented across classrooms by 2003 (NCCA, 2008). Its main aim is to promote the use of Irish as a natural language of communication (DES, 2007a). It encourages an integrated, communicative and task-based instructional approach to teaching and learning Irish (DES, 2006; DES, 2007a). The teacher is expected to use Irish as the language of instruction and communication (DES, 2007a), and employ active instructional approaches that maximise students' contact time with the language such as group work (DES, 1999). Oral language development and purposeful language activities are the cornerstones of the curriculum (INTO, 2011) aligning with language learning objectives of most primary schools in Europe (Edelenbos, 2005).

The Irish curriculum has one stream for Irish-medium schools and a second for English-medium schools (DES, 1999; DES, 2007a; INTO, 2004). It is presented in two parts: a curriculum statement containing rationale, aims, learning objectives, themes and language skill development, and a set of guidelines for teachers. Both documents are available in Irish only (NCCA, 2013). The NCCA sees this as being problematic for teachers at the lower end of the language proficiency spectrum (NCCA, 2010) and it also makes it difficult for parents to support their children's learning (NCCA, 2013). The INTO believes the curriculum should be made available in English (INTO, 2004).

¹⁰ Similar to the audio-lingual approach, but where film strips were used alongside audio dialogues.

The Irish curriculum identifies the following ten themes based on students' experiences and interests (DES, 2007a):

1. Myself (Mé Féin);
2. At home (Sa Bhaile);
3. School (An Scoil);
4. Food (Bia);
5. Television (An Teilifís);
6. Shopping (Siopadóireacht);
7. Pastimes (Caitheamh Aimsire);
8. Clothes (Éadaí);
9. Weather (An Aimsir); and
10. Special occasions (Ócáidí Speisialta).

It encompasses six categories of language functions (feidhmeanna teanga) (NCCA, 2013). The focus of a language function is more about communicating in a meaningful way and less about language form (Savignon, 1976). A communicative curriculum involves a functional approach to syllabus design, where language functions provide thematic content and sequence in teaching materials (Edelenbos & Suhre, 1994; Savignon, 1987). Vocabulary and grammar are chosen according to the functions being taught (Richards, 2005). The language functions for third class include (DES, 1999; NCCA, 2013):

1. Engage in social interaction (caidreamh sóisialta a dhéanamh);
2. Give and ask for information (eolas a thabhairt agus a lorg);
3. Express and ask for opinion (dearcadh a léiriú agus a lorg);
4. Influence others (dul i gcion ar dhuine);
5. Structure conversation (struchtúr a chur ar chomhrá); and
6. Request clarity during a conversation (soiléiriú a lorg i gcomhrá).

Lesson content is organised into four strands according to the four language skills: listening, speaking, reading and writing. Emphasis is placed on the listening and speaking strands in infant classes, with equal emphasis on all four strands in all other classes (DES, 1999; DES, 2007a; INTO, 2011). Students in most English-medium schools begin to read and write formally in Irish in second class. Some schools start earlier in first class and later in third class, however (INTO, 2004). Each strand is sub-divided into three strand units (DES, 2007a):

1. Fostering interest (ag cothú spéise);
2. Using language (ag úsáid teanga); and
3. Understanding language (ag tuiscint teanga).

A typical Irish lesson is broken into three phases (DES, 1999; DES, 2007a) reflecting each of the strand units above:

1. A pre-communicative phase where the teacher provides new language input (DES, 1999) oriented towards meaning (Littlewood, 2007). Ó Duibhir & Harris (2012) believe that students should be given a ‘repertoire of immediately useful formulaic expressions’ during this phase (p. 57). In addition, expressions such as those in the conditional tense can be learned for immediate use and analysed in later years (Ó Duibhir & Cummins, 2012).
2. A communicative phase where learning tasks and social interactions are structured so that students can use the language they have learnt to communicate authentically with one another (DES, 1999).
3. A post-communicative phase where teachers revise, evaluate and ensure students’ understanding (DES, 1999).

A new language curriculum is currently being developed addressing key literacy skills and strategies along with the integration of a range of digital media (DES, 2011). The new Irish curriculum aims to provide teachers with clearer statements of learning outcomes and practical examples of students’ learning achievements (DES, 2011). The 20-year strategy states that the new Irish curriculum will foster oral and written competence in the language through enhanced continuous professional development (CPD) for teachers, learning resources and support for innovative approaches to teaching and learning (Department of Community, Rural and Gaeltacht Affairs, 2010).

3.2.4.2 SUBJECT REVIEW OF IRISH

Following the implementation of the revised PSC in 1999, the NCCA conducted a two-stage review of the subjects between 2005 and 2007 - Irish was reviewed in the second stage. Data were gathered via teacher questionnaires and focus groups with teachers, students and parents. Students identified Irish as their least favourite subject during the first review phase (NCCA, 2005). Their lack of enthusiasm was described in terms of the ‘monotony of doing so much prescribed written work every day’ and the lack of technology use in their Irish lessons (ibid, p. 203). These findings conflicted with the core objectives of the Irish curriculum promoting a

communicative, enjoyable and interesting experience in the Irish-language classroom (NCCA, 1999).

The second phase (2006/2007) of their evaluation revealed that student competency in Irish had fallen and that speaking, listening and writing skills were significantly lower than in previous studies (NCCA, 2008). Teachers felt the writing strand was the most challenging to teach – grammar, spelling and phonics in particular (ibid). It also found that listening and reading instruction required attention (ibid). The NCCA revealed that students in 52% of classes had poor listening skills and that only 56% of students made good progress in oral language development (ibid). Personal and creative writing skills were also reported to be at a low standard, where students were observed having difficulties in writing simple stories due to their lack of appropriate language (ibid). Another key challenge noted in this review was the limited use of technology in Irish lessons (NCCA, 2010).

The Inspectorate also conducted two independent reviews of the standards of Irish in primary school classrooms. The first evaluation involved inspections across forty schools and observations in 159 classrooms in 2005 (DES, 2007a). Inspectors observed that almost half of the teachers had difficulties with language proficiency or with their ability to teach Irish (ibid). This confirms a link between language and teaching competencies, where teachers with a stronger competence in Irish often display better teaching methodologies (DES, 2013; Devitt et al., 2016). In classes where teachers placed an emphasis on oral language skills and on comprehension development, students ‘wrote accurately and fluently, and displayed an understanding of the language and of the purpose of writing’ (DES, 2007a, p. 64). The Inspectorate conducted a second study between 2010 and 2012 (DES, 2013). Inspectors also found the quality of teaching to be problematic in one fifth of the Irish lessons reviewed (ibid). They found that students did not engage in communicative opportunities in 22% of Irish lessons evaluated during incidental inspections (ibid, 2013).

In addition to the reviews aforementioned, Harris and Murtagh (1999) conducted the most comprehensive body of research to date on Irish-language teaching in English-medium primary schools (Devitt et al., 2016). Their study, the Twenty Classes Study, involved the direct observation of teaching and learning of Irish lessons in twenty sixth-grade classes (Harris, 2005). They found that students were more successful in learning Irish when they were favourably disposed towards it and highly motivated to learn it (Harris, 2005; Harris et al., 2006; Harris & Murtagh, 1999). They also reported a positive correlation between students speaking Irish at home and high achievement in school, and an even stronger correlation between use at home and their attitude towards it (Harris & Murtagh, 1999). Lessons that were communicative in nature resulted in higher achievement; higher levels of attention, interest and participation; and lower levels of anxiety about speaking individually in class (Harris, 2005; Harris et al., 2006). Activities emphasising group work, meaning over form and good student/teacher relationships helped to eradicate student anxiety (Harris & Murtagh, 1999). They also found that students tended to use ‘simple Irish in a purposeful way in order to participate effectively’ (Harris, 2005, p. 971).

In an earlier study undertaken by the INTO in 1984, English-medium primary school teachers were surveyed regarding the teaching of Irish (Ó Riagáin, 1986). Ó Riagáin (1986) notes how 75% of teachers felt their students had a good understanding of Irish, 54% of teachers believed students had good reading skills, and 33% felt their students had good written and speaking skills. These findings reflected those of another study conducted by Harris in 1982, where his data revealed that less than a third of sixth class students mastered the learning objectives in relation to spoken Irish (Harris, 1982). As part of a longitudinal study and as an extension of the previous study, Harris et al. (2006) again identified a decline in the standards of proficiency achieved in all primary schools, but most significantly in English-medium schools between 1985 and 2002. Seventy seven percent of teachers believed that students’ proficiency in Irish had declined (Harris et al., 2006). More students failed in speaking, listening and writing activities in 2002 compared to 1985 (Harris et al., 2006). Data indicate a fall in the number of students achieving fluency from a little over half in 1985 to less than one third in 2002 (Harris, 2007).

Interestingly, Harris & Murtagh (1999) found that approximately 46% of students conveyed a positive attitude to learning Irish in school. McCoy et al. (2012) investigated data from the Growing Up in Ireland (GUI) study in relation to teaching and learning at primary schools and found that 74% of children ‘sometimes or always liked Irish’ (p. 44). These results indicate that ‘motivation for Irish has remained largely stable’ between 1999 and 2012 (Devitt et al., 2016, p. 8), despite the decline in language proficiency (Harris et al., 2006).

3.3 CHALLENGES ASSOCIATED WITH IRISH LANGUAGE TEACHING AND LEARNING

The standard of language acquisition in English-medium primary schools is insufficient despite the 1500 class hours that students engage in during Irish-language lessons (DES, 2007; NCCA, 2008; Harris et al., 2006). The following section outlines the many challenges that exist, both inside and outside of the classroom, when it comes to the teaching and learning of Irish, as well as some possible resolutions.

3.3.1 EXTERNAL CHALLENGES

The social and psychological distance between the student and the community and culture surrounding the target language affects a student’s communicative ability in second language learning and their incentive to engage with it (Edelenbos et al., 2006; Myles, 2002). Harris (2005) notes this sociolinguistic consequence when he states ‘that pupils have little or no interactive contact with the spoken language outside school’ and are less motivated to learn it as a result (p. 974). This is especially so when the number of native speakers of Irish is diminishing (DES, 2007; Ó Laoire & Harris, 2006) and a large proportion of the population claiming knowledge of Irish is composed of students required to learn it in school (Rialtas na hÉireann, 2006; DES, 2007). Real-life uses of language should be reflected in language activities that deeply interest students (Ó Laoire, 2004). They need to feel that their school-acquired knowledge is relevant to the outside world (Hernández-Ramos & De La Paz, 2009). Teachers must therefore develop authentic and credible Irish-language learning activities for use within the classroom (Harris & Murtagh, 1999; Harris, 2005; Ó Laoire & Harris, 2006).

Research also reveals that a parent's negative attitude and their hands-off approach to their children's Irish-language learning is problematic (DES, 2007; Harris et al., 2006; Harris, 2007; Harris, 2009; NCCA, 2008). Parental encouragement has a positive effect on student achievement in Irish and an even stronger effect on their attitudes and motivation to learn it (Harris & Murtagh, 1999; Harris, 2005). Harris (2007) found that 42% of parents in English-medium schools rarely, if ever, spoke Irish to their children. Any initiative which would improve their grasp of the language and attitude towards it is likely to improve their children's proficiency in Irish (Harris & Murtagh, 1999), such as administering Irish classes to parents (DES, 2007a). Furthermore, any opportunities students get to share their learning with their parents will affect learning in a positive way as students provide 'occasions for parents to recognise and praise achievements' (Harris & Murtagh, 1999, p. 174).

3.3.2 INTERNAL CHALLENGES

A student's attitude affects language learning (Myles, 2002). Harris (2007) found that 41% of parents of children attending English-medium schools believed their children had 'no particular feelings about studying Irish', while 31% believed they disliked it (Harris, 2007, p. 33). In the classroom, student speech is rehearsed and rarely produced in the context of real communication (Harris & Murtagh, 1999; Harris, 2005; Harris et al., 2006; Knobel & Lankshear, 2006; Ó Laoire, 2004). In half of the classes evaluated, students engaged in tasks that were too easy (DES, 2007a). In addition, standards of achievements tend to decline in senior grades as students become less enthusiastic and lose interest in learning Irish (INTO, 2004; DES, 2007; NCCA, 2008; Harris & Murtagh, 1999). This can be attributed to the fourth-grade slump where students start to experience more demanding, complex and abstract learning materials that differ from previous learning materials (Cummins, 2008).

The DES (2015) found that the majority of Irish teachers (both primary and post-primary) hold constructivist views of teaching but employ traditional approaches in their classrooms. In fact, 84% of teachers engage in whole class teaching most days (McCoy, Smyth & Bank, 2012). In addition, subject inspectors found the quality of teaching to be problematic in one fifth of the Irish lessons they reviewed and found that students did not participate in communicative activities in 22% of the Irish lessons evaluated during incidental inspections (DES, 2013). Harris and Murtagh

(1999) found that collaborative learning accounted for less than 1% of their observations in their Twenty Classes study. Furthermore, the DES (2007a) discovered that only 68% of teachers use Irish as the language of communication while teaching Irish.

Adopting a more integrative and active instructional approach through increased group work and peer tutoring would engage students more in their learning (DES, 2007a; DES, 2011; INTO, 2011; Ó Duibhir & Cummins, 2012). Collaborative learning is especially encouraged as students would then depend less on reinforcement outside of school (Ó Laoire & Harris, 2006). Teachers often complain of noise and disruption during group work (INTO, 2004) but this diminishes as students become accustomed to working collaboratively (Harris & Murtagh, 1999). Furthermore, it would be more constructive to provide students with more challenging tasks and opportunities to create language themselves (DES, 2007a), placing greater emphasis on self-expression and on quality over quantity (INTO, 2011). The 20-year strategy aims to support innovative approaches to teaching and learning (Department of Community, Rural and Gaeltacht Affairs, 2010). Emphasising story is one way to 'extend the language repertoire' of students (DES, 2007a, p. 53). Students delivering presentations is another way (Harris & Murtagh, 1999). Encouraging students to accept their language mistakes would also be beneficial (NCCA, 1999) and to use these opportunities to 'explore conceptual understanding' together (Applefield et al., 2001, p. 51).

There has been a growing dissatisfaction amongst teachers in terms of teaching Irish (an increase of 16% between 1985 and 2002) along with a decline in favourable attitudes towards Irish (Harris, 2009; Harris, 2007). Furthermore, a large majority of teachers (65%) feel that they do not have sufficient opportunities to practise their Irish (Harris et al., 2006). A teacher's language competence affects Irish-language learning (Harris et al., 2006). In their study, Harris et al. (2006) found that 25% of teachers rated their standard of spoken Irish as weak and 1% rated their standard as being very weak. In another study, 20% of teachers declared themselves insufficiently competent to teach Irish and tended to focus on traditional written approaches to language learning as opposed to oral approaches (DES, 2007). Additionally, there is a lack of professional development opportunities for teachers in both language and pedagogy (DES, 2007a; Edelenbos et al., 2006). Pre-service

and continuous professional development (CPD) courses would bolster teacher competence in Irish, as well as attitudes towards it (Devitt et al., 2016). Harris et al. (2006) found that 61% of teachers wanted to attend a course to improve their Irish. The 20-year strategy promises a Gaeltacht Scholarship scheme for teachers to attend such intensive courses in the Gaeltacht to enhance their proficiency in the language (Department of Community, Rural and Gaeltacht Affairs, 2010). This strategy also aims to provide investment and support in professional development for teachers (ibid). Co-teaching would also ensure that more competent teachers provide Irish instruction (DES, 2007a). Teachers could team-teach to their strengths, where more competent teachers undertake Irish.

There are 236 learning objectives in the Irish curriculum (NCCA, 2013) and teachers feel under considerable pressure to cover them, especially with large class sizes (Edelenbos et al., 2006; NCCA, 2008) and limited teaching time (DES, 2011; Harris, 2007; INTO, 2004; INTO, 2011; NCCA, 2008). The 1999 PSC reduced the minimum time allocated to Irish from five hours per week to three and a half hours per week (Devitt et al., 2016; Harris, 2009). It has been shown that any limitation on time will affect each of the four language skills, oral skills in particular (Edelenbos et al., 2006). Students with less exposure to spoken Irish are more likely to disengage from their learning (Devitt et al., 2016).

Students' proficiency in the language will increase if they are exposed more to it (Harris, 1988; Harris, 2007; Ó Duibhir & Cummins, 2012). Instructing and communicating through the medium of Irish and avoiding translation during Irish lessons is one such way to increase exposure (DES, 2007a). Increasing core time for Irish would be difficult to implement as time is allocated across all curricular subjects system-wide, but a content and language integrated learning (CLIL) approach could be more accessible (Harris et al., 2006; Harris, 2007). All primary teachers are Irish teachers and they can therefore use Irish outside of Irish lessons (Ó Duibhir & Cummins, 2012). According to Harris, CLIL can enhance proficiency and lead to higher achievement in Irish (Harris, 1982; Harris, 2005). The DES believes this approach could expand contact with the language without overloading the curriculum (DES, 2007). In a national survey, 22% of teachers stated that they taught other subjects through Irish with Physical Education, Music and Visual Arts being the most common subjects taught in this way (DES, 2007a). Even though it is

time consuming in terms of planning and implementation, students react positively to such experiences (NCCA, 2008).

There is a shortage of commercially-produced learning resources available for the Irish language (DES, 2007a; Harris & Murtagh, 1999; Harris, 2005; NCCA, 2008) compared to the ‘glossy sophisticated textbooks and high tech learning materials’ of more dominant languages (Ó Laoire & Harris, 2006, p. 15). Harris & Ó Duibhir (2011) assert that one of the greatest challenges of implementing a communicative approach in Irish classrooms is the lack of authentic contexts. There needs to be greater provision of Irish-language resources (NCCA, 2008). The 20-year strategy states that there will be more textbooks and language learning resources made available to teachers (Department of Community, Rural and Gaeltacht Affairs, 2010). In addition, despite 80% of teachers valuing technology as a useful tool in teaching, it is only used on a daily basis 25% of the time in Irish classes, compared to 42% in English classes (INTO, 2011). The DES has ensured that all future curricula will include a focus on the development of digital learning skills in the classroom (DES, 2015).

3.4 PEDAGOGICAL APPROACHES ADOPTED IN THE LANGUAGE CLASSROOM

This section describes the common pedagogical approaches language teachers adopt in their classrooms. The researcher begins with an overview of the traditional instructional approach still common in many classrooms. She then focuses on constructivist approaches, which are more suited to the digital knowledge society in which we live (Wegerif, 2006). She discusses the theory and practical applications of communicative and collaborative pedagogies, in particular, and their key role in language learning.

3.4.1 TRADITIONAL PEDAGOGICAL APPROACHES

Behaviourism underpins traditional pedagogical approaches in the classroom. Learning is characterised as being a passive solitary activity (Neo, 2007; Sawyer, 2008) where ‘inert knowledge’ (Brown, 1992, p. 144) and skills are taught in isolation through rote learning (Cummins, 2008; Richards, 2005; Urrea, 2002) and where the teacher controls the dissemination of information to students (Gillen &

Barton, 2010; Neo, 2007; Sawyer, 2008). Sawyer (2008) refers to traditional instruction as instructionism. Instructionism promotes superficial knowledge (Krajcik & Blumenfeld, 2006) and ‘shallow thinking in relation to content-loaded curricula’ (Gredler, 2012, p. 126) and assessment typically measures how well students memorise and regurgitate surface information (Sawyer, 2008).

One common approach to traditional teaching is working through Gagné’s (1985) theory of instructional events. This involves nine events in the delivery of short isolated lessons: gaining attention; presenting lesson objectives; recalling prior knowledge; presentation; guidance; performance; reinforcement; retrieval; and generalisation. Teacher-talk dominates as the vast majority of tasks consists of ‘short-answer, low-level questions’ requiring students to recall facts and rules (Webb et al., 2006, p. 65). This form of linear communication does not create ‘conditions for mutual exchange and clarification of ideas’ (Sharan & Shachar, 1988, p. 3) and it can often contribute to ‘poor attitudes towards learning and schooling’ (Blumenfeld et al., 1991, p. 371). As Applefield et al. (2001, p. 49) note such emphasis on information transmission and its recall can only lead to ‘prodigious amounts of forgetting’ and an inability to transfer to other contexts (Reeves et al., 2005). Unfortunately, this traditional mode of instruction still dominates the majority of our classrooms (DES, 2015; Gros, 2002; Nilsson, 2010; Resnick & Rosenbaum, 2013; Webb et al., 2006; Wells & Arauz, 2006) and does not correspond to the needs of today’s students (Gros, 2002; Sawyer, 2008).

3.4.1.1 TRADITIONAL APPROACHES TO LANGUAGE LEARNING

Traditional approaches to language learning include the grammar-translation method and the audio-lingual method (Harris & Murtagh, 1999; Ó Duibhir & Cummins, 2012) and involve the passive transmission of grammatical knowledge from teacher to students (Edelenbos & Suhre, 1994; Savignon, 1987). The grammar-translation method explicitly endorses rules and practice in the four main language skills, while the audio-lingual method expects students to become ‘passive imitators’ of the language they hear (Ó Duibhir & Cummins, 2012, p. 38) repeating chorally until committed to memory (Applebee & Langer, 1986; Harris & Murtagh, 1999; Richards, 2005). There is an emphasis on teacher-centred activities, direct instruction, correct sentence formation and accurate pronunciation (Richards, 2005). Rote and repetition-based cognitive activities such as memorising, reading aloud,

question-and-answer practice and language drills are common in an effort to minimise error production (Harris, 2005; Harris et al., 2006; Richards, 2005) as it is assumed that such errors ‘would quickly become a permanent part of the learner’s speech’ (Richards, 2005, p. 7). Teachers feel that every element of a new task has to be ‘taught from scratch’, as though students have no prior knowledge or resources upon which to draw (Applebee & Langer, 1986, p. 186).

Applebee & Langer (1986) note how traditional instruction is ‘usually organized around skills to be learned rather than purposes to be accomplished’ (p. 187). They view language curricula as ‘hierarchies of skills’, where teaching and testing approaches emphasise the ‘component skills rather than the whole’ (Applebee & Langer, 1983, p. 187). The four skills of listening, speaking, reading and writing (Little, 1991) are taught in a discrete way as if they have ‘boundaries around them and could be developed in isolation with little regard for either their complexity or their interrelatedness’ (Savignon, 1987, p. 236). In this way, knowledge is learned out of context and therefore meaningless to the student (Applebee & Langer, 1983). Applebee & Langer (1983) state that there is ‘neither the need nor the opportunity for the students to reflect on new ideas, to integrate or apply them in new ways, or to make them their own’, and this inevitably leads to boredom and frustration (p. 171). These types of learning activities are associated with negative outcomes in terms of achievement, attitude and interest, as well as higher levels of anxiety (Harris, 2005; Harris et al., 2006). Even though Palincsar & Brown (1984) found slight improvements in students learning language skills in isolation, they believe that this ‘improvement is often slight and fleeting’, and that there is very little evidence of transfer to other areas of learning (p. 122). They attribute this to passive learning, where the student ‘responds to instruction but does not fully understand the activities she has been induced to use’ (Palincsar & Brown, 1984, p. 122).

3.4.2 CONSTRUCTIVIST PEDAGOGICAL APPROACHES

Constructivism makes learning more meaningful, enabling students to learn integrated and usable knowledge as opposed to compartmentalised and decontextualised information (Applefield et al., 2001; Blumenfeld et al., 1991; Neo, 2007; Sawyer, 2008). Papert (1993a) refers to this as ‘knowledge-in-use’ (p. 63). Ertmer et al. (2010) define meaningful learning as learning that ‘enables students to construct deep and connected knowledge, which can be applied to real situations’ (p.

257). In contrast to rote or superficial learning, meaningful learning takes into account the needs and interests of students (Urrea, 2002) with the desired outcome of new information being ‘solidly anchored in the learner’s knowledge base’ (Eysink & de Jong, 2012, p. 584). According to Azevedo (2013), cognitively meaningful involvement in classroom activities occurs when students demonstrate interest and competency in, and ownership of, the learning task.

Constructivism underpins active and task-based learning approaches (Gros, 2002; Hernández-Ramos & De La Paz, 2009). The teacher scaffolds instruction by breaking down tasks into smaller ones; by modelling, prompting and coaching students; and by gradually releasing responsibility to the learner (Blumenfeld et al., 1991). The teacher becomes a mentor who ‘does not necessarily have the absolute truth’ guiding and advising during the learning process (Urrea, 2002, p. 4). Students actively participate in their learning through interaction with others (Neo, 2007; DES, 2015; Resnick, 2014) and they learn more effectively when they externalise and articulate their developing knowledge (Sawyer, 2008). Students take responsibility for their own learning (DES, 2015; Neo, 2007) and are ‘motivated to persist at authentic problems’ (Blumenfeld et al., 1991, p. 371).

Socio-constructivism, in particular, underpins communicative language learning and group learning (Barron, 2000; Blumenfeld et al., 1991; Gee, 2015; Knobel & Lankshear, 2006; Ó Duibhir & Cummins, 2012; RIA, 2011). Students work communicatively and collaboratively on complex authentic tasks and are ‘exposed to their peers’ thinking processes, appropriation of others’ ideas and ways of thinking’ (Applefield et al., 2001, p. 39). Such active instructional practices engage students in deeper learning (Blumenfeld et al., 1991) and is essential in primary education (Volman, 2005).

3.4.2.1 COMMUNICATIVE LANGUAGE LEARNING

According to Bruner (1981), language learning occurs in the context of discourse. Instead of engaging in individual cognitive activities, as is the case with a constructivist approach, language learners participate in social cognitive activities (Bloome & Green, 2015; Bruner, 1981; Knobel & Lankshear, 2006; Pahl, 2007). This communicative approach encourages students to use the target language in a meaningful and social way as they engage in authentic and challenging activities

(Harris & Murtagh, 1999). Students should be encouraged to reflect upon their language use (Ó Duibhir & Cummins, 2012) and be enabled to discover grammar rules and vocabulary as they need them (Richards, 2005). The teacher becomes a facilitator, growing students' self-confidence as they take charge of their own learning (Harris & Murtagh, 1999).

Error correction is a characteristic of traditional language instruction (Flyman Mattsson, 1999). In a communicative approach, students are afforded greater opportunity to experiment with language (Flyman Mattsson, 1999; Richards, 2005) and to engage in sustained speech without worrying about language accuracy or being subjected to grammatical corrections (Flyman Mattsson, 1999). Nonetheless, teachers need to find a balance between authentic communication activities and analytical form-focused activities (Cummins, 2008; Flyman Mattsson, 1999; Harris & Murtagh, 1999; Harris & Ó Duibhir, 2011; Kennedy, 1991; Ó Duibhir & Cummins, 2012; Overland, 2004).

Ó Duibhir & Cummins (2012) differentiate between explicit focus on form in decontextualised grammar lessons and drawing students' attention to grammatical errors as they occur incidentally. Incidental correction carried out in context is more beneficial compared to explicit form-focused instruction (Edelenbos et al., 2006; Ó Duibhir & Cummins, 2012; Richards, 2005). Graham & Perin (2007) conducted a meta-analysis study into experimental and quasi-experimental research on adolescent writing instruction and found that traditional grammar instruction, where constructs were taught explicitly and systematically, did not improve the quality of students' writing. They found sentence-combining instruction to be more effective as students focused on form integrated in meaning and composed more complex and sophisticated sentences. Norris & Ortega (2000) also conducted a meta-analysis of the findings from 49 experimental and quasi-experimental studies investigating the effectiveness of second language instruction. They found instruction incorporating a 'focus on form integrated in meaning' as effective as instruction involving a focus on form (p. 500). A communicative classroom enables students to experience the language as well as to analyse it (Savignon, 1987).

In his study of 800 meta-analyses on achievement in K-12 education, Hattie (2009) found that student feedback makes learning more transparent; highlighting a student's understanding, misconceptions and errors. Fullan (2013) believes that feedback to students is 'probably the most powerful teaching strategy we can use' and that students learning from their mistakes is crucial to their progress (p. 27). Guzdial (1994) notes that a good teacher 'balances the number and kind of comments between providing opportunities for the student to learn through failure with keeping a student motivated and preventing inefficient exploration' (p. 4).

In terms of language learning, corrective feedback such as recasts and prompts support students' acquisition of vocabulary and grammatical constructs as meaning is negotiated (Shiel et al., 2012; Harris & Ó Duibhir, 2011). A recast occurs when the teacher 'repeats the utterance with the error corrected' (Ammar & Spada, 2006, p. 545). They are unobtrusive, implicit and maintain a focus on meaning (ibid). Prompts elicit the correct language from the student (ibid). The critical element with a prompt is that the correct form is withheld, providing 'clues to prompt students to retrieve these correct forms from their existing knowledge' (Lyster & Saito, 2010, p. 268). Harris & Ó Duibhir (2011) found prompts to be more effective than recasts in response to errors. Ammar & Spada (2006) conducted a quasi-experimental study into the benefits of both and also found that prompts to be more effective. They found that 'high-proficiency learners benefited equally from both prompts and recasts, whereas low-proficiency learners benefited significantly more from prompts than recasts' (Ammar & Spada, 2006, p. 543).

Communicative language learning emphasises language-in-use (Bloome & Green, 2015; Bruner, 1981; INTO, 2004; Savignon, 1987; Shiel et al., 2012), where language skills work in unison and not in isolation (Gee, 2015; Kennedy, 1991; Richards, 2005). Harris & Ó Duibhir (2011) undertook a synthesis of key studies into the teaching and learning of second languages in order to inform discussion about language learning in general and Irish in particular. They found the communicative approach to be the most effective approach to second language learning (Harris & Ó Duibhir, 2011).

3.4.2.2 GROUP LEARNING

Students learn best when they are working on personally meaningful group projects (Barron, 2000; Blumenfeld et al., 1991; Kaptelinin, 1999; Resnick et al., 2009; Resnick, 2012; Webb & Mastergeorge, 2003; Webb et al., 2006). They learn at a deeper level, retain information, and develop communication and teamwork skills (Bressan & Cribb, 2007; Oakley et al., 2004). Interestingly, McCoy et al. (2012) found that recently qualified teachers were more likely to engage in group work compared to more experienced teachers.

Groups can involve both face-to-face interactions (peer-to-peer) and shoulder-to-shoulder interactions (peers interacting with technology) (Harris et al., 2009). In their meta-analyses study into group learning, Sharan & Shachar (1988) revealed an overall positive effect for group learning versus competitive or individualistic forms of instruction. They also conducted an experimental study into group learning and found that students achieved a superior level of achievement in Geography and History when placed in groups of four compared to the whole-class approach. In another experimental study into group learning, where one group received traditional instruction and the other technology-assisted, project-based instruction, Hernández-Ramos & De La Paz (2009) found that students in the latter group demonstrated greater learning gains in history and conveyed a more positive attitude towards learning history compared to students in the comparison group. Sadik (2008) conducted a study into the impact of digital storytelling in language classrooms and found that students, working in groups, undertook greater responsibility for their learning.

One form of group learning is collaborative learning, where students depend upon one another and work together towards a common goal in order to complete a task (Gros, 2002). In a language classroom, students work on tasks in groups and pairs (DES, 1999; McCoy et al., 2012) aiding the development of communicative proficiency in language learning (Flyman Mattsson, 1999; Harris & Murtagh, 1999; Littlewood, 2007; Richards, 2005). Tasks make learning interesting, meaningful and authentic (Harris & Murtagh, 1999; Littlewood, 2007; Parsons & Taylor, 2011). It enhances motivation (Harris & Ó Duibhir, 2011) and affords greater opportunities for spontaneous communication (Ó Duibhir & Cummins, 2012).

3.4.2.2.1 COLLABORATIVE PEDAGOGY

Ainsworth (2008) defines collaborative pedagogy as a process in which ‘people learn by constructing knowledge through interactions with others’ and through negotiating meaning, exploring and sourcing content (p. 31). According to Sawyer (2006), collaboration has been shown to enhance learning in a wide range of subjects. In terms of language learning, students hear the language in use and produce a greater amount of language than they would in teacher-fronted activities (Flyman Mattsson, 1999; Richards, 2005).

Time-on-task is ‘vital to developing fluency’ (Philp, 2014, p. 4). Oral proficiency within whole class interaction is difficult to achieve, however, as there is little opportunity for individual students to practise the target language (Philp, 2014). During peer-to-peer interaction, students feel ‘valued, supported and safe from ridicule’ (ibid, p. 2) and are more inclined to take risks in experimenting with new language (ibid). The ‘opportunity for thinking and rethinking about one's ideas, and for expressing and rephrasing one's thoughts in conversation with peers’ assists students to develop ‘greater control over the functional and communicative aspects of their language repertoire’ (Sharan & Shachar, 1988, p. 25). Students who question, express and defend opinions (Price et al., 2003) recognise misconceptions, clarify meaning and repair inconsistencies in their own thinking (Mishra & Girod, 2006; Nelson et al., 2009; Sawyer, 2006; Webb & Mastergeorge, 2003; Webb et al., 2006; Wells & Arauz, 2006).

Collaborative discourse enlightens students about each other's understanding enabling them to resolve and negotiate any discrepancies that may arise (Barron, 2000; Greeno, 2006; Price et al., 2003; Stahl et al., 2006). Palincsar (1998) believes that students of all levels of expertise can successfully ‘contribute ideas and knowledge to the learning environment, for the appropriation of others’ (p. 372). Hübscher-Younger & Narayanan (2003) view convergence as evidence that learning has occurred, which they define as ‘the collective arrival at a shared meaning during collaborative learning’ (p. 316). Students accept a teacher's instruction and feedback unconditionally, while they are more likely to contest and challenge each other's ideas and feedback during peer-to-peer interaction, thereby deepening understanding (Philp, 2014). When students teach others, ‘they learn as much as those they are

teaching’ as they need to understand the material at a deeper level in order to do so (Hattie, 2009, p. 187).

During collaborative activities, students draw on higher order skills such as reflection and metacognition (Barron et al., 1998; Kaptelinin, 1999). Reflection is an ‘important cognitive activity which is critical for effective learning’ (Guzdial, 1994, p. 4). Errors are noticed in times of reflection as students externalise and articulate their developing knowledge (Sawyer, 2008). Metacognition is the ‘knowledge about and control of one's own learning’ (Brown, 1992, p. 146). Barron et al. (1998) define metacognition as students ‘knowing the goal of their learning, self-assessing how well they are doing with respect to that goal, understanding that revision is a natural component of achieving a learning goal, and recognising the value of scaffolds, resources, and social structures that encourage and support revision’ (p. 273). Student conversations around joint activity develop their metacognitive skills and their ability to reflect as they are encouraged to think about their thinking (Brennan & Resnick, 2012) and to ‘formulate plans, track progress, and evaluate solutions’ (Blumenfeld et al., 1991, p. 373). Providing students with autonomy to direct their activities in this way enhances students’ interest too (Blumenfeld et al., 2006). The teacher scaffolds interactions, encouraging students to elaborate their understanding through prompting or questioning (Philp, 2014; Price et al., 2003). Teachers deliver ‘just-in-time instruction’ (Barron et al., 1998, p. 289) to support ‘just-in-time learning’ (ibid, p. 290). A more able peer or technology tool can also scaffold learning (Price et al., 2003).

3.4.2.2.1.1 INSTRUCTIONAL SCAFFOLDING DURING COLLABORATION

Stahl et al. (2006) observe how ‘individual learners have different developmental capabilities in collaborative situations than when they are working alone’ (p. 415). The ZPD is the difference between these two capabilities (Stahl et al., 2006) – a student’s actual development level while working independently and her potential development level while working collaboratively with the teacher or more capable peers (Vygotsky, 1978). This study’s theoretical framework, chapter 2, outlines Vygotsky’s construct of ZPD and Wood et. al’s (1976) construct of scaffolding in more detail.

While investigating reading comprehension strategies, Palincsar & Brown (1984) called for a method of instruction that would encourage students to participate successfully in their learning at their own level of capability. They found that scaffolding enabled this approach, where the teacher tuned in to each student's learning needs and gauged her own level of participation in their learning. In this situation, the teacher must estimate starting competence and must continuously evaluate it until competency has been achieved, all the time increasing her demands accordingly until the student is competent in the task, thereafter reducing her level of participation (Palincsar & Brown, 1984). Scaffolding student articulation and creation, through prompts and hints, leads to enhanced learning as support is tailored to their needs in achieving their learning goals (Sawyer, 2008). The teacher extends the student's language skills and prevents him 'from sliding back toward earlier forms once more sophisticated ones have been achieved' (Langer & Applebee, 1986, p. 175).

According to Applebee & Langer (1983), effective instructional scaffolding in language learning involves activities and tasks that meet five criteria of intentionality, appropriateness, structure, collaboration and internalisation. The researcher has mapped each of these components to Wood et al.'s (1976) original functions of scaffolding. Both frameworks address learning at each student's individual ZPD. Both provide the students with opportunities to use the skills and knowledge learned, and to enable the teacher to evaluate student performance and to adapt instruction and task activity as necessary.

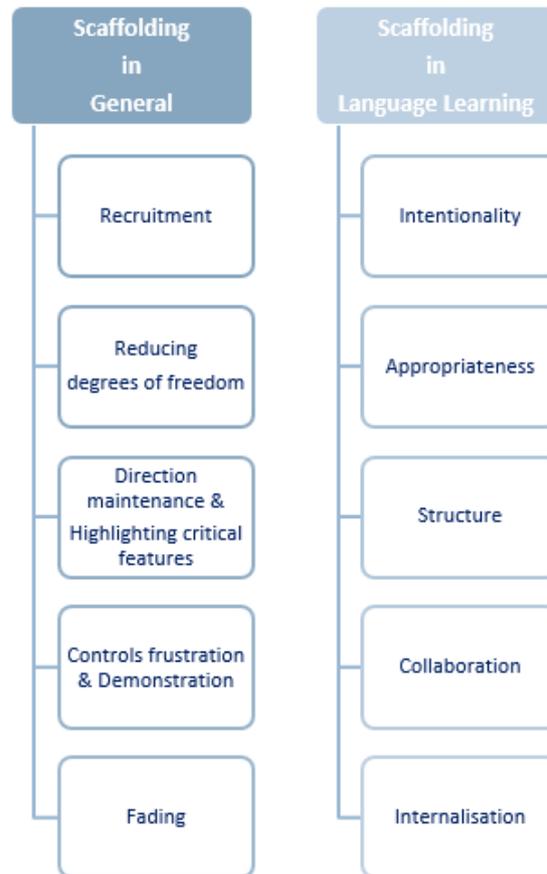


Figure 3.1: Instructional Scaffolding in Language Classroom

To enable effective instructional scaffolding in a language classroom, learning activities must meet the following five criteria:

1. A purposeful task (intentionality) is one that encourages ownership of learning by giving ‘students the room to have something of their own to say in their writing or in the interpretations they draw in their reading’ (Applebee & Langer, 1986, p. 185).
2. A challenging task (appropriateness) is one that builds upon prior knowledge (Applebee & Langer, 1983) and that ‘allows for the accomplishment of some goal that would otherwise be either unattainable or quite cumbersome to complete’ (Addison Stone, 1998, p. 344).
3. Structuring a task so that skills and knowledge are integrated purposefully and leads to a ‘natural sequence of thought and language’ (Applebee & Langer, 1983, p. 170). Learning situations where students’ abilities ‘have

not yet matured but are in the process of maturation' (Vygotsky, 1978, p. 86).

4. Collaborative tasks where the teacher extends student learning 'without rejecting what they have accomplished on their own' (Applebee & Langer, 1983, p. 170). Teachers do this through modelling, rephrasing, recasting, questioning and praising in a non-judgemental way (Applebee & Langer, 1986).
5. As content and skills are internalised by the student and as they demonstrate increased competency (Palincsar, 1986), scaffolding is gradually withdrawn (Applebee & Langer, 1983) until they can complete similar tasks without further help (Applebee & Langer, 1986).

3.5 CONCLUSION

This chapter has reviewed the status of the Irish language and explored the challenges associated with the teaching and learning of Irish at primary level. It has also compared both the traditional and constructivist pedagogical approaches commonly adopted in the classroom, with a particular focus on language learning. Furthermore, it provides a strong foundation for the socio-constructivist constructionist approach to language learning advocated in her classroom intervention.

4 CHAPTER FOUR: LITERATURE REVIEW

4.1 INTRODUCTION

The researcher compares traditional and constructivist uses of technology in the classroom, and explores the reality of digital fluency skills in students. She outlines the literature surrounding the constructionist tools employed in this study, namely digital and animated storytelling technologies. The researcher discusses the key role engagement plays in student learning, the pivotal role motivation plays in language learning in particular, and how technology can serve as a hook to attract and maintain engagement during the learning process. An overview of the digital landscape in Irish primary schools is also depicted, as well as common barriers to technology integration in the classroom.

4.2 TECHNOLOGY IN THE CLASSROOM

In the ensuing sections, the researcher discusses the traditional and constructivist use of technology in the classroom, as well as the importance of digital fluency development in schools.

4.2.1 TRADITIONAL USE OF TECHNOLOGY

Technology was first introduced to classrooms in the 1960s via Computer Assisted Instruction (CAI) (Papert, 1993b). These computer tutoring machines (Kay, 1972; Mayer, 2005) administered exercises ‘traditionally given by a teacher at a blackboard, a textbook, or a worksheet’ (Papert, 1993a, p. 41). Little (1991, p. 13) compares CAI to a ‘surrogate teacher’ as many language learning computer applications model the discourse structure of the frontal classroom, where ‘everyone learns the same thing at the same time’ (Sawyer, 2008, p. 7). CAI promoted surface learning (Ertmer et al., 2010; Higgins et al., 2012; Volman, 2005), information presentation and low-end learning tasks (Luckin et al., 2012; Sadik, 2008). Indeed, Mayer (2005) claims that CAI failed to produce ‘better learning than traditional teacher-lead instruction’ (p. 9).

Technology is ‘minimally useful as a pedagogical tool’ when it is used to transmit information (Cummins, 2008, p. 40). Martinez & Stager (2013) refer to the traditional use of technology in the classroom as ‘the low-hanging fruit of creative expression in the digital age’ (p. 84). The focus is individual learning (Kafai and Resnick, 1996) as opposed to social learning (Kaptelinin, 1999) and knowledge conservation as opposed to knowledge production (McCombs, 2000). Unfortunately, technologies are still employed to ‘reinforce outmoded approaches to learning’ (Resnick, 2002, p. 32) and are still used as an add-on to lessons where the focus is information transmission (Richards, 2005; Koehler & Mishra, 2009). Inadequate teacher capabilities and infrastructure, an unsupportive school culture and organisation constraints often lead to technology being used primarily in this way (Fishman et al., 2004).

4.2.2 CONSTRUCTIVIST USE OF TECHNOLOGY

Technologies contributing to constructivist learning aid active, deeper and authentic learning (Volman, 2005; Cummins, 2008; INTO, 2011). They enable teaching and learning rather than being the object of learning (Eskicioglu & Kopec, 2003; Fishman et al., 2004; Luckin et al., 2012; Mayer, 2005; Papert, 1993a; Robin, 2008). They help students explore knowledge and support meaningful knowledge construction (Dede, 2000; McCombs, 2000). They encourage the development of 21st century skills in the classroom (Barron, 2000; Kaptelinin, 1999; Hall, 2012; Higgins et al., 2012; Resnick, 2014; Trilling & Fadel, 2009). Fullan (2013) categorises such skills as:

- Ways of thinking: creativity, critical thinking, problem solving and decision making;
- Ways of working: communication and collaboration;
- Tools for working such as technology; and
- Skills for living in the world: personal, career and social responsibility.

Constructing with technology provides students with ‘objects-to-think-with’ (Papert, 1993b, p. 11), externalising their thoughts and learning in the process (Papert, 1993b; Parsons & Taylor, 2011; Sawyer, 2008). It provides students with immediate feedback (Edelenbos et al., 2006; Gros, 2002), encouraging them to reflect upon their learning and highlighting any discrepancies in understanding (Collins, 2009;

Kay, 1972; Wang et al., 2010). It connects with their outside world experiences making learning more authentic and meaningful (Ertmer et al., 2010; Johnson et al., 2014).

Martinez & Stager (2013) believe that constructionism is the best way to implement constructivist learning in the classroom, supporting learning that is active, social and student-centred. Luckin et al. (2012) conducted a systematic review of studies involving technological innovations in education and found that students were more motivated to learn in a constructionist way as they engaged with technology in an active hands-on approach. They found that almost a quarter of all teacher-led examples they reviewed involved learning through making while few research examples existed, suggesting that ‘this is a rising trend in practice that has not yet been subjected to a great deal of research’ (Luckin et al., 2012, p. 25). This research proposes therefore to incorporate constructionist tools into its language learning environment, enabling students to reconstruct and enliven their stories while drawing on all four language skills in the process. In this way, students create multiple representations of their learning, thereby embedding language holistically at a deeper level.

4.2.3 DIGITAL FLUENCY

Technology is becoming ‘increasingly central to the lives of today's children’ (Palincsar & Ladewski, 2006, p. 308) and students of all ages ‘regularly engage with a number of new digital media in their out-of-school lives’ (Hughes & Robertson, 2010, p. 22). The European Commission has projected that by 2020, 90% of European jobs will require digital skills (Johnson et al., 2014). Schools have a responsibility, therefore, to prepare students for living and working in a digital society (Mullen & Wedwick, 2008; Resnick, 2002).

Seymour Papert (1928–2016) is one of the most prominent authors in educational technology (O'Shea and Koschmann, 1997) and is seen by many as the pioneer of computing in schools (Berry, 2013). He promoted technology in the classroom as a way to enable students to reflect on their thinking and doing, thereby making learning more active and personally meaningful (Papert, 1993b). Resnick (2012), a doctorate student of Papert, reveals how Papert envisioned a world in which ‘children not only learn to use new technologies, but become truly fluent with new

technologies’ (p. 42). Gros (2002) calls for students to become creators and not ‘mere consumers of technology’ (p. 332), echoing Papert (1993a) when he states ‘I have always yearned for ways of learning in which children act as creators rather than consumers of knowledge’ (p. 13). Resnick et al. (2009) argue for the notion of digital fluency to extend beyond browsing and interacting, and to include designing and creating. It is not enough to teach students how to use a technology tool; they must also learn how to express themselves and to create objects of significance (Berland et al., 2013; Resnick, 2002).

According to Prensky (2001), however, students are ‘native speakers of the digital language of computers, video games and the Internet’ and refers to them as digital natives (p.1). He believes they are ‘no longer the people our educational system was designed to teach’ as they have grown up surrounded by the ‘toys and tools of the digital age’ (ibid). Prensky (2001) categorises everybody else as digital immigrants, including teachers. Ertmer et al. (2010) describe digital natives as those who are ‘comfortable using a variety of technology tools’ (p. 259) as they possess a natural competence in using digital tools (INTO, 2011). Knobel & Lankshear (2006) refer to digital natives and immigrants as insiders and newcomers to cyberspace.

Higgins et al. (2012) debunk the myth that children are digital natives or insiders, however, as learning capacity has remained the same over the last fifty years, and despite the fact that children have grown up using technology, they are only ‘fluent in their use of some technologies, but none are expert at all of them’ (p. 20). Fullan (2013) also counters the digital native argument when he states that students today ‘are technological whizzes when it comes to the tool, but pedagogically clueless with respect to getting the best out of it’ (p. 59). Littlejohn et al. (2012) have also found conflicting evidence suggesting students’ technical skills are not as advanced as educators believe them to be. In fact, Johnson et al. (2014) disclose students’ low digital competence as a challenge across most European schools. Resnick et al. (2009) also question the title of digital natives stating ‘few are able to create their own games, animations, or simulations’ even though they interact with digital media (p. 62). Brennan & Resnick (2012) note how the majority of people are consumers of technology, but do not engage with it for creation and self-expression purposes. Resnick (2012) compares interaction and creation with the ability to read and write stating ‘it is as if they can “read” but not “write”’ (p. 42).

4.3 TECHNOLOGY-ENHANCED LEARNING

In the following sections, the researcher examines the Technological Pedagogical and Content Knowledge (TPACK) framework, design-based learning and software-realised scaffolding as approaches to successfully achieving a technology-enhanced learning environment. These approaches have been integrated into the researcher's instructional intervention and have steered her design and instructional approach during her time in the classroom. In addition, students created Irish stories using three constructionist tools: digital storytelling, animated storytelling and coding.

The focus of this study is storytelling in the language classroom where students engage in design activities creating digital and animated stories in and through the medium of Irish, using three different types of constructionist technology tools – digital storytelling, digital animation and coding. The following section reviews some of the pertinent literature surrounding digital storytelling in relation to language pedagogy. Language develops in the social context of discourse where students discover how to express and interpret each other's intentions and meanings (Bruner, 1981). When students collaboratively design with technology, they become engaged in the construction of learning artefacts and they make meaning by exploring, discussing and reflecting upon the concept they are endeavouring to represent (Hoban & Nielsen, 2010). Learning becomes more authentic and meaningful when 'students co-create and develop their own knowledge' (Nelson et al., 2009, p. 80). In this instance, technologies can be used as media for learning through communication, collaboration, construction and expression – visually, orally and aurally (Levin et al., 2001; Wilensky, 1996).

When students design artefacts for others, their learning deepens (Niemi et al., 2014; Kafai, 1996). They place a higher value on the activity (Knobel & Lankshear, 2006) and become more cognisant of their 'audience, purpose, and form' (Sylvester & Greenidge, 2009, p. 291). When they share their creations with others, they acquire a deeper understanding of the topic (Evard, 1996, p. 224). Students step back from being immersed in the activity and make it more 'tangible and shareable' as they describe it to others (Ackermann, 1996, p. 28). In their study of literacy interactions, Many & Henderson (2005) found that having an audience impacted the students' learning by motivating them to be more thoughtful in what they were 'doing and learning' (p. 346).

4.3.1 DIGITAL STORYTELLING

Digital stories are ‘short vignettes that combine the art of telling stories with multimedia objects including images, audio, and video’ (Rossiter & Garcia, 2010, p. 37). They are ‘typically just a few minutes long’ and are often used to convey personal anecdotes, fictional tales and historical events, as well as ‘inform or instruct on a particular topic’ (Robin, 2006, p. 1). When employed as a pedagogical tool, digital storytelling ‘recognizes, honors, and encourages the narrative meaning-making process as central to learning’ (Rossiter & Garcia, 2010, p. 38). According to Thesen & Kira-Soteriou (2011), digital storytelling provides an authentic purpose for writing, making it a more meaningful and attractive activity to students. As students engage in the writing and the digital creation process, their sense of ownership increases (INTO, 2004; Xu et al., 2011).

Storytelling is a powerful teaching tool for language learning (Tsou et al., 2006) because the ‘process of composing a story is also a process of meaning-making’ (Matthews-DeNatale, 2008, p. 2). According to Edelenbos et al. (2006), stories play an important role in children’s language learning as they are naturally interested in them and they appeal to their imagination. Storytelling can enhance a student’s ability to communicate effectively with others along with developing speaking, listening, comprehension, recall and vocabulary skills (Gelmini-Hornsby et al., 2011; Harris & Ó Duibhir, 2011; Speaker et al., 2004). Tsou et al. (2006) found that integrating digital storytelling into the language curriculum is a creative language learning technique that can improve a student’s proficiency in all skills – reading, writing, speaking and listening. Gelmini-Hornsby et al. (2011) found that collaborative writing – where students plan, draft and revise their compositions together, had a strong impact on improving the quality of students’ writing, as well as developing research, problem-solving, interpersonal and presentation skills during the storytelling process (Robin, 2006).

Literacy includes the ‘capacity to read, understand and critically appreciate various forms of communication including spoken language, printed text, broadcast media, and digital media’ (DES, 2011, p.8). The classroom is very much dominated by conventional literacies of reading and writing, however, and engagement with digital literacies is largely confined to students’ lives outside schools (Fullan, 2013; Knobel & Lankshear, 2006), where screens are replacing the page as the dominant media

and texts are becoming increasingly multimodal (Kress, 2010). When integrated with technology, storytelling enables the amalgamation of traditional and digital literacies in the classroom, motivating students to engage with their learning at a deeper level (Thesen & Kira-Soteriou, 2011).

Teacher-created digital stories can introduce content and serve as a hook to capture students' attention (Robin, 2006; Robin, 2008; Xu et al., 2011). Using this approach, it can facilitate discussion about presented topics and help 'make abstract or conceptual content more understandable' (Robin, 2008, p. 222). However, student-created digital stories promote deeper learning and the development of 21st century skills as students actively participate in the composition and creation processes of digital storytelling (Dogan & Robin, 2008; Niemi et al., 2014; Robin, 2006; Robin, 2008; Sadik, 2008; Xu et al., 2011). It encourages student-centred learning and engagement (Nelson et al., 2009; Xu et al., 2011) and fosters reflection (Matthews-DeNatale, 2008; Niemi et al., Sadik, 2008; 2014; Xu et al., 2011). Most importantly, students experience 'learning by doing' (Xu et al., 2011, p. 181). They pursue their own learning path as they explore and acquire knowledge (Luckin et al., 2012; Niemi et al., 2014; Volman, 2005). Scaife & Rogers (2005) used a virtual puppet theatre with young children to support learning through play. They found that instead of passively watching a story unfold, students became more engaged when they created, edited and directed stories in an imaginary setting. Time issues appear to be the biggest barrier to implementing digital storytelling in the classroom, however, along with access to technology resources and expertise (Dogan & Robin, 2008; Sadik, 2008; 2006; Sylvester & Greenidge, 2009; Tsou et al.). That said, Hall & Long (2012) highlight the emergence of many 'easy-to-use and intuitive' technologies for digital storytelling (p. 1).

4.3.2 ANIMATED STORYTELLING

Instructional animations have been appearing in classrooms with increasing frequency since the early 1980s (Ainsworth, 2008). They are commonly used to convey concepts of dynamic phenomena not easily observable, such as the workings of the circulatory system or the movement of atoms in a gas (Ainsworth, 2008; Betrancourt, 2005; Harrison III & Hummell, 2010; Mayer & Moreno, 2002; Morrison et al., 2000; Scheiter & Gerjets, 2010; Weiss et al., 2002).

Conflicting evidence exists, however, in terms of their effect on learning. Weiss et al. (2002) believe that animation can improve retention of information. Findings from a meta-analysis conducted by Höffler & Leutner (2007) reveal a ‘medium-sized overall advantage of instructional animations over static pictures’ (p. 722). Conversely, many researchers believe that animation provides little or no benefit compared to static graphics conveying the same information, despite their attractiveness and appeal (Betrancourt, 2005; Scheiter & Gerjets, 2010; Kim et al., 2007). In their experimental study, Guttormsen & Krueger (2001) found that the use of presented animation in learning did not have a ‘superior effect on knowledge acquisition, but notably also not detrimental effects’ (p. 4). Dwyer & Dwyer (2006) conducted an experimental study examining the role of animation in achieving four different kinds of learning outcomes across five independent studies involving 781 students. They found that animation, as an instructional tool, was not ‘a viable instructional variable for improving achievement’ (Dwyer & Dwyer, 2006, p. 386).

Mayer et al. (2005) conducted a set of four experiments involving lessons consisting of narrated animations (computer group) and lessons consisting of paper-based diagrams and text (paper group). Both types of lessons explained operational processes across four different content areas. They found that the paper group ‘performed significantly better than the computer group on 4 out of the 8 comparisons, and there was no significant difference on the rest’ (Mayer et al., 2005, p. 256). The results they obtained supported the static media hypothesis stating ‘static illustrations with printed text reduce extraneous processing’ (ibid). They recommend a series of static images that ‘clearly depict the possible states of each part in the system’ over an animated approach (ibid, p. 265). According to Morrison et al. (2000), the failure to find ‘beneficial effects of animation over equivalent static diagrams is not surprising’ (p. 58).

Nonetheless, this study is concerned with student-constructed animations and their effect on learning appears to be more positive. Animation is rarely used in this way, however (Hoban et al., 2007), especially in the area of literacy and language learning (Ainsworth, 2008). Animation, once the property of highly skilled artists at well-equipped studios, is now an accessible way for students to tell stories (Martinez & Stager, 2013). Students of all ages can create animations across a wide variety of educational environments (Harrison III & Hummell, 2010). Neo (2007) notes how

critical thinking skills, problem-solving and communication skills become enhanced as they are exposed to group work. When students co-create animations, they learn to negotiate meaning and develop interpersonal skills (Harrison III & Hummell, 2010). They engage in discussion and build upon each other's contributions; they reflect on the subject at hand leading to richer and deeper understanding (Gelmini-Hornsby et al., 2011). They also draw on metacognition activities as they plan, monitor and evaluate their progress in animation-creation activities (Ainsworth, 2008; Harrison III & Hummell, 2010).

Hübscher-Younger & Narayanan (2003) found that students collaboratively creating animations of algorithms resulted in increased learning compared to students who simply observed animations. Eysink & de Jong (2012) found that that students generating animations outperformed students who simply viewed animated pedagogical agents via an instructional animation. Hoban et al. (2007) monitored ten teachers as they participated in a slowmation¹¹ workshop and incorporated it into their teaching. They found that eight out of the ten teachers used this approach across various subjects and that two of those eight deeply integrated the approach into their regular teaching practices. The authors describe how the approach deepened student understanding, promoted reflection and fostered peer learning. In another study, Hoban & Nielsen (2010) refer to several school-based action research studies in Australia that used claymation (clay animation¹²) to support student literacy skills. They reveal how the animation process helped students to develop an understanding of particular concepts as they reflected upon them in multiple ways during the creation procedure. Students interacting with multiple and varied representations of concepts and tasks can lead to deeper, more meaningful learning (VanderArk & Schneider, 2012; Scaife & Rogers, 2005).

¹¹ Slowmation is slow motion animation and is a form of Claymation, but where designers can use any type of material, such as plasticine, drawings, fruit, etc. It plays at 2 frames per second (fps) as opposed to 24fps (Hoban et al., 2007, p. 207).

¹² Claymation is a form of stop-motion, which involves taking digital photographs of objects as they are moved manually to simulate movement (Hoban et al., 2010, p. 34).

4.3.3 CODING

Coding is another medium for expression (Resnick et al., 2009) and communication (Guzdial, 1994). Coding in the classroom is best approached as a way of ‘thinking about and exploring disciplines other than computer science’ (Guzdial, 1994, p. 1). When students learn to code, they construct representations of the concepts they are learning, thereby deepening their understanding in the process (Guzdial, 1994; Resnick et al., 2009). Students get to reflect on their own thinking and learning (Resnick et al., 2009). Papert (1993b) notes that children ‘embark on an exploration about how they themselves think’ when they engage in coding as they shape the computer programme into their way of thinking (p. 19). In their systematic review of technological innovations, Luckin et al. (2012) encountered studies demonstrating the positive impact of students creating animations and stories using technology tools such as Scratch. Chapter 9, Design Cycle 3, discusses this particular application in detail in relation to the researcher's empirical study.

During the coding process, students are encouraged to explore and play with the technology tool as they code and write their stories (Resnick & Rosenbaum, 2013). It is a playful way to approach and solve problems through tinkering and discovery (Martinez & Stager, 2013). Tinkering is a process of trial and error that explores problems and possible solutions in new and creative ways (Wagner, 2015). Coding also involves finding and correcting errors in coded scripts, a process known as debugging (Papert, 1993b) and is viewed as a form of self-assessment (Berry, 2013). Errors become a 'source of information' (Papert, 1993a, p. 184). According to Papert (1993b), this debugging philosophy aids learning as errors or mistakes can ‘lead us to study what happened, to understand what went wrong, and, through understanding, to fix [them]’ (p. 114). When students care about resolving mistakes, they demonstrate a ‘commitment of attention and resources to reasoning about an aspect of a problem’ by engaging in revision and correction (Reiser, 2004, p. 287). Post-primary schools in Ireland have implemented short courses in coding at junior cycle level (years 1 – 3). While the DES recognises the importance of coding, no initiative to introduce coding into the primary curriculum is underway at primary level (DES, 2015).

4.3.4 PEDAGOGICALLY-INTEGRATED LEARNING

According to Fullan (2013), technology has ‘dramatically affected virtually every sector in society that you can think of except education’ (p. 72). Despite the significant investment in terms of time and money, there has been limited impact on learning in general (Kaptelinin, 1999; Kozma, 2011; Luckin et al., 2012) and on language learning in particular (Cummins, 2008; Edelenbos et al., 2006). This is due to poor integration with pedagogy (Resnick, 2002; Fullan & Donnelly, 2013) and the use of inappropriate research methodologies in exploring this area (Reeves, 2006; Kozma, 2011). Pedagogically-integrated technology, however, can play a transformational role in education (Resnick, 2007). As Papert (1993b) exclaims: ‘the revolution I envision is of ideas, not of technology. It consists of new understandings of specific subject domains and in new understandings of the process of learning itself’ (p. 186).

Higgins et al. (2012) conducted a meta-analysis study¹³ into the impact of technology on academic achievement over a period of forty years. They found that technology had a positive influence on learning, but attributed this enhanced learning to more effective teachers using technologies more successfully. Hattie (2009) also found that the use of technology in the classroom became more effective when teachers were shown how to use it pedagogically. As Fullan (2013) notes, if we get the ‘pedagogy right and incorporate technology accordingly, learning will become easier, deeper, and more engaging’ (p. 21). Technology, as a knowledge construction tool, is ‘one component in a complex ecology of teaching and learning’ (Cummins, 2008, p. 8). Bangert-Drowns & Pyke (2002) note how students enthusiastically engage with technology initially, but discern that ‘such enthusiasm does not always translate into meaningful learning’ (p. 34). It is necessary to build the appropriate pedagogical approaches, scaffolding and technological methods into the learning environment to maintain such enthusiasm. Adopting Koehler & Mishra’s (2006) Technological Pedagogical and Content Knowledge (TPACK) framework and incorporating a design-based learning approach into classroom activities are two possible ways of integrating technology in a pedagogical way. Software-realised scaffolding reinforces this combined approach to successfully bring about a

¹³ This study involved a synthesis of 45 meta-analyses.

technology-enhanced language-learning environment. These approaches are discussed in the following sections.

4.3.4.1 TECHNOLOGICAL PEDAGOGICAL AND CONTENT KNOWLEDGE FRAMEWORK

TPACK is a conceptual framework for integrating technology into the classroom (Koehler & Mishra, 2006). It focuses on the three bodies of knowledge required for effective pedagogical practice in a technology-enhanced learning environment for a particular subject domain (Koehler & Mishra, 2009). These include knowledge about pedagogy, content and technology (Koehler & Mishra, 2005; Koehler & Mishra, 2009; Mishra & Koehler, 2006; Mishra & Girod, 2006; Nelson et al., 2009). Content knowledge (CK) is knowledge pertaining to the subject domain (Mishra & Koehler, 2006). Pedagogical knowledge (PK) incorporates a 'generic form of knowledge that is involved in all issues of student learning, classroom management, lesson plan development and implementation, and student evaluation' (Mishra & Koehler, 2006, p. 1027). A teacher with deep pedagogical knowledge is aware of students' prior knowledge and understands how they construct knowledge and acquire skills (Mishra & Koehler, 2006). Technological knowledge (TK) involves the technical skills, experience and expertise involved in using technology in the classroom. Dede (2000) likens technology to a moving target as it is constantly evolving, with some quickly becoming obsolete (Koehler & Mishra, 2009). The diagram below depicts three pairs of knowledge intersection (TCK, PCK, TPK) and one triad (TPACK) (Mishra & Koehler, 2006). It also reflects the 'dynamic classroom context' that requires teachers to constantly 'shift and evolve their understanding' (Mishra & Koehler, 2009).

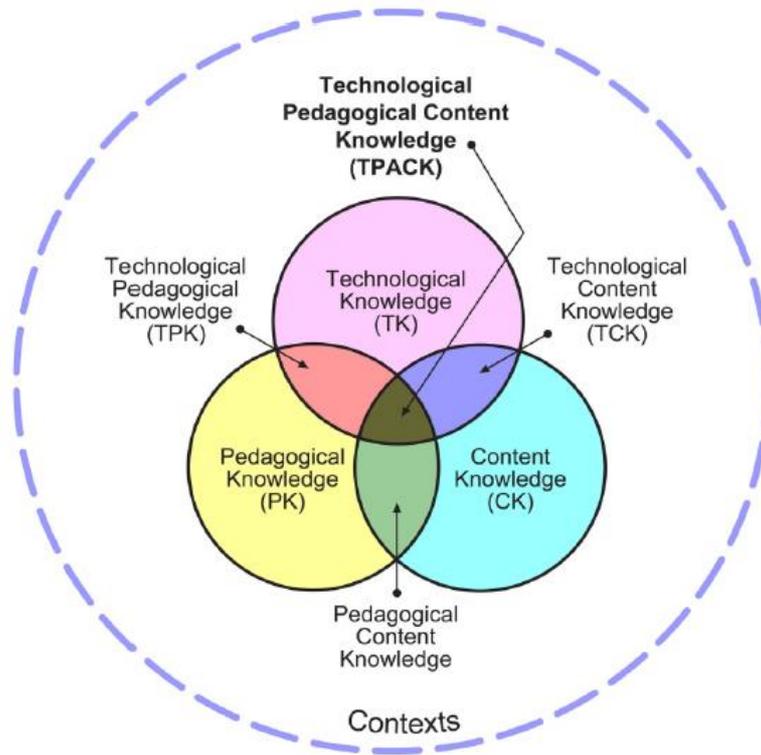


Figure 4.1: TPACK Framework (Koehler & Mishra, 2009)

TPACK-competent teachers understand the ‘true nature of effective teaching and learning with technology’ and devise meaningful, collaborative and technology-rich learning opportunities for their students (Nelson et al., 2009, p. 85). The majority of technologies, however, are ‘not designed for educational purposes’ (Koehler et al., 2011, p. 147) and teachers often bemoan the lack of resources available to them (Ertmer et al., 2010). Nonetheless, technologies are malleable and teachers can adapt and repurpose them to achieve their pedagogical goals (Gillen & Barton, 2010; Koehler & Mishra, 2005; Mishra & Koehler, 2006; Nelson et al., 2009). This creative repurposing of technology is known as melioration (Koehler et al., 2011). Should technology break down in class, a common occurrence, teachers are encouraged to use such situations in an instructionally valuable way by troubleshooting and working through problems with students (Koehler & Mishra, 2005; Papert, 1993b). They learn from their teacher when they share the problem and solve it together until it is completely understood (Papert, 1993b). In addition to TPACK-competent teachers, Koehler & Mishra (2005) believe that student learning can be enhanced through design-based learning activities.

4.3.4.2 DESIGN-BASED LEARNING

As aforementioned in chapter 2, two theoretical constructs underpin design activities: socio-constructivism (Vygotsky, 1978) and constructionism (Papert, 1991). Design activities fall under the ‘broader rubric of project-based activities’ (Mishra & Girod, 2006, p. 46). Project-based learning can be traced back to the educator and philosopher John Dewey (Krajcik & Blumenfeld, 2006). It is a constructivist pedagogical approach to active learning where knowledge is socially constructed through interaction, collaboration and reflection around meaningful tasks and experiences (Hernández-Ramos & De La Paz, 2009). Project-based learning facilitates students to learn by doing (Krajcik & Blumenfeld, 2006) and generates a product – it is the learning that accrues during the process or trajectory that is of value, however (Koschmann, T., 1999; Richards, 2005). It encourages deep understanding through student-centred learning approaches (Richards, 2005). Carver (2006) defines deep understanding as going ‘beyond basic recall of facts and procedures’ (p. 205). It also develops teamwork skills such as ‘planning, organising, motivating others and allocating resources’ (Berry, 2013, p. 22). Martinez & Stager (2013) view meaningful projects as a powerful way to learn 21st century learning skills. Resnick (2014) reveals that ‘when people work on projects that they care about, they tend to work harder and learn more’ (p. 5).

In a communicative language classroom, project-based learning takes the guise of task-based learning. Richards (2005) describes a learning task as a ploy to engage students in their learning while grounding the activity in aspects of language study. Langer & Applebee (1986) believe that ‘literacy activities are never content-free’ (p. 173) and should ‘always be taught in the service of some domain-related or task-related goal’ (p. 185). A student does not simply learn to read and write, but ‘learns to read and write about particular things in particular ways’ (Langer & Applebee, 1986, p. 173). Task-based learning ensures that students are more aware and attentive to language meaning, understanding and interaction rather than focusing on linguistic structure only (Richards, 2005).

Design activities promote an active, creative and social learning experience in the classroom, giving them a greater sense of control and responsibility for their own learning and more opportunities to reflect upon their learning (Resnick, 2014, 2007). They engage students in challenging and authentic tasks, and promote formative

assessment techniques (VanderArk & Schneider, 2012). Learning becomes more meaningful for students as they are not learning for the next test (Volman, 2005). Resnick (2014) posits the Four Ps of Creative Learning – Projects, Peers, Passion and Play as a model to support design-based learning. Projects actively engage students in meaningful learning tasks. Peers involve collaboration and knowledge sharing with others. Passion involves working through challenges and being more dedicated and engaged in the activity. Play promotes creativity, playful experimentation, exploring, tinkering and testing new ideas (Resnick, 2014). According to Robinson (2011), creativity is the ‘greatest gift of human intelligence’ (p. xiii). It involves ‘working in a highly focused way on ideas and projects, crafting them into their best forms and making critical judgments along the way about which work best and why’ (Robinson, 2011, p. 5). Koehler et al. (2011) note that playful learning is voluntary, intrinsically motivating and ‘independent of external rewards or incentives’ (p. 153).

Collins et al. (2004) call for educators to create environments where ‘students are not afraid to put forth new ideas, share what they learn, and produce products they can show to the world’ (p. 18). Design-based learning activities give students such an opportunity, where they can bring ‘their own unique interpretations to subject matter ideas’ as opposed to ‘conventional schooling, where ideas are impressed rather than expressed’ (Mishra & Girod, 2006, p. 49). Students engaging in design activities learn about design while creating artefacts and managing projects, and learn through design when learning curricular content (Kafai, 1996b; Mishra & Girod, 2006). Design activities facilitate knowledge construction, representation and expression (Kafai, 2006) and the digital products can be used as learning artefacts by other students (Mishra & Girod, 2006). In this study's instructional intervention, design-based learning activities, underpinned by the TPACK framework, provided students with another layer of scaffolding, enabling them to undertake tasks that led ‘to greater success and opportunities to learn’ (Quintana et al., 2004, p. 341) as they carried out tasks that were ‘beyond their capabilities’ (Collins, 2009, p. 56).

4.3.4.3 SOFTWARE-REALISED SCAFFOLDING

Many technology tools have features that scaffold students in their learning (Davis & Miyake, 2004; Hoadley, 2004). Software-realised scaffolding refers to situations in which the ‘tool changes the task in some way so that learners can accomplish tasks that would otherwise be out of their reach’, often guiding learners through key components of the workflow (Reiser, 2004, p. 275). Pea (2004) supports the design of a learning environment in which ‘people and machines join together in helping someone learn something in the sense that certain scaffolding activities can be the responsibility of the teacher (or peers) and other scaffolding activities provided by the software’ (p. 444).

Technology use in the classroom is influenced by this ‘interplay among teachers, students, software [and] curriculum’ (Quintana et al., 2004, p. 340). In fact, Tabak (2004) notes that in Wood et al.’s (1976) initial experiment into scaffolded learning, the authors used a wooden puzzle, which was in itself designed to reduce the degrees of freedom for the student and that it was therefore ‘the tutor, the blocks, and the child that [came] together in constructing the pyramid’, promoting the use of multiple scaffolds in the classroom (p. 310). It is important to note that while resources such as a dictionaries and reference lists support learning, they do not enable performance like technology tools can, and are therefore, not considered scaffolds (Guzdial, 1994). Pea (2004) notes, however, that fading is not possible when technology is used as a scaffolding support as ‘people cannot do the activities without the technologies, or it becomes meaningless to ask whether they can do so’ (pp. 432-433). Sherin et al. (2004) suggest viewing technology tools as a ‘static feature of a learning interaction’ and not dynamic in terms of its diminishing use (p. 417). They use the calculator as an example and view it as a ‘fixed feature of the task of solving mathematics problems’ and that the notion of scaffolding should be extended to incorporate this view (Sherin et al., 2004, p. 393). Interestingly, Tabak (2004) observes that once the student learns the sequence of actions in using a particular technology tool, she becomes independent in her use of it. One can therefore say that she has ‘achieved independent performance’ (Tabak, 2004, p. 320).

Teachers must continually diagnose students' understanding and know when 'students are ripe for new learning' in their ZPDs (Brown, 1992, p. 169). Technology can also scaffold learning in this way by:

- Communicating processes to students through contextual demonstrations (Guzdial, 1994);
- Organising students' work by reminding them of pending tasks (Reiser, 2004);
- Coaching students as they create artefacts through hints and reminders about their work (Guzdial, 1994);
- Making learning more productive by 'narrowing options, preselecting data, or offloading more routine parts of the task' (Reiser, 2004, p. 284);
- Summoning students' attention to something that they might otherwise overlook (Reiser, 2004); and
- Eliciting articulation from students to encourage reflection (Guzdial, 1994). This type of feedback provides a student with opportunities to reflect as she reviews, reconsiders and reworks her creation (ibid).

4.3.4.4 ENGAGEMENT

The following section describes the key role engagement plays in student learning with a particular focus on language learning in a technology-enhanced learning environment. Student ability, curricula and good teaching approaches are not enough on their own to ensure language-learning gains (Dörnyei, 1998; Guilloteaux & Dörnyei, 2008). Student engagement is 'paramount to learning success' (Lim et al., 2006, p. 213). Learning tasks need to be authentic, meaningful, novel, interesting, varied, challenging and collaborative in order to motivate students to engage with their learning, however (Blumenfeld et al., 1991; Collins, 2009; Dörnyei, 1998; Edelenbos et al., 2006; Edelson & Reiser, 2006; McCombs, 2000; Parsons & Taylor, 2011).

Csikszentmihalyi (1991) describes deep engagement as being in a state of flow – a mental state in which a person is fully immersed in an activity. Flow is characterised by a feeling of intense concentration, full involvement, deep enjoyment and success in the process of an activity (Csikszentmihalyi, 1991). It is a state that 'emerges in the space between frustration and boredom' (Pilke, 2004, p. 347) and where the sense of time becomes distorted (Csikszentmihalyi, 1991). Reaching this state of flow does

not come through 'passive, receptive, relaxing times', but when 'a person's body or mind is stretched to its limits in a voluntary effort to accomplish something difficult and worthwhile' (ibid, p. 2). Learning is enhanced when students experience a state of flow (Ainsworth, 2008), where a challenging interesting task is appropriate to the student's skillset and his ability to complete it (Pilke, 2004; O'Brien & Toms, 2008; Blumenfeld et al., 2006; Csikszentmihalyi, 1991). A number of other factors enhance the possibility of creating a flow experience in learning such as clear goals, immediate feedback, and an elimination of distractions and a fear of failure (Csikszentmihalyi, 1991). Engaged students 'identify learning goals, deploy strategies to bridge the problem space, monitor progress toward goals, and adapt their strategies' (Bangert-Drowns & Pyke, 2002, p. 23). They are attentive, committed, persistent, and find meaning and value in learning tasks (Fullan, 2013; O'Brien & Toms, 2008).

The literature around engagement has 'primarily and historically focused on intellectual aspects of learning such as increased achievement measured through test scores (Parsons & Taylor, 2011, p. 4). Behavioural indicators of engagement exist too such as student effort, time on task, attention and persistence. Emotional indicators such as motivation, interest, enthusiasm and enjoyment also influence student engagement (Bangert-Drowns & Pyke, 2002; Lim et al., 2006; Niemi et al., 2014; Parsons & Taylor, 2011). A student's motivation to learn influences their level of engagement with their learning (O'Brien & Toms, 2008). Intrinsically motivated students learn best (Wagner, 2015) as they become completely immersed and engaged in their work (Parsons & Taylor, 2011). Intrinsic motivation is fuelled by playful experimentation, passion and purpose (Wagner, 2015), while rewards and grades promote extrinsic motivation in learning (Sharan & Shachar, 1988). Students are motivated to learn when they 'can see usefulness of what they are learning and when they can use that information to do something that has an impact on others' (Bransford et al., 2000, p. 61), especially when they can draw connections between their learning and their personal lives (Blumenfeld et al., 2006). The opportunity to showcase their work to an audience is another key element in motivating students to learn (Martinez & Stager, 2013).

This research study draws on Dörnyei's taxonomy of four motivational strategies to engage students in language learning (Guilloteaux & Dörnyei, 2008). These include:

1. Creating motivational learning conditions by encouraging a supportive and pleasant classroom environment and promoting a good teacher/student rapport;
2. Generating initial motivation by hooking students' attention, by developing a positive attitude towards the target language, by increasing students' expectancy of success and by making teaching activities relevant;
3. Maintaining and protecting motivation by using stimulating, enjoyable and relevant tasks, by promoting student autonomy, by setting learning objectives, and by providing students with experiences of success; and
4. Encouraging positive retrospective self-evaluation through effective and encouraging feedback, by increasing student satisfaction, and by offering rewards and grades in a motivating manner.

Technology can engage students in their learning (Blumenfeld et al., 1991; Blumenfeld et al., 2006; Cummins, 2008; Harris et al., 2009; Nelson et al., 2009; Niemi et al., 2014; Parsons & Taylor, 2011; Reinking & Watkins, 1996; Wang et al., 2010). The researcher believes that technology can facilitate Dörnyei's taxonomy of motivational strategies in the language learning classroom. Students experience flow when they interact with technology (Pilke, 2004). That said, the novelty factor is often associated with technology use in the classroom. Sandholtz et al. (1994) investigated the long-term impact of technology on student engagement. They found that technology did in fact have an enduring positive effect on student engagement when it was employed alongside other tools as students were less likely to reach saturation point (Sandholtz et al., 1994). In addition, its impact was more permanent when technology was integrated into the curriculum as opposed to being taught as another curricular subject (ibid). They also found that students who experimented and tinkered with technologies had a more long-lasting impact on engagement (ibid).

Bangert-Drowns & Pyke (2002) list seven levels of engagement students experience when they interact with technology. This taxonomy guided the empirical study and enabled the researcher to monitor and scaffold student-software interactions in order to optimise learning. They include:

1. Exploration, where students discover the technology functions from a personally meaningful perspective.
2. Critical engagement, where students manipulate the technology to test its functionality and their own understanding of the content in relation to the learning artefacts they intend to create.
3. Self-regulated interest, where students display motivation, interest, concentration, competence and excitement in their learning – a state of flow (Csikszentmihalyi, 1991).
4. Structure-dependent engagement, where students competently navigate and operate the technology to pursue learning goals (Bangert-Drowns & Pyke, 2002) but do not engage in exploratory tasks (Lim et al., 2006).
5. Frustrated engagement, where students attempt to achieve specific technology goals unsuccessfully due to a lack of navigational and operational competence. Students are ‘unable to use the software effectively’ (Lim et al., 2006, p. 215).
6. Unsystematic engagement, where students seem confused and lost, and move from one incomplete activity to another without apparent reason (Bangert-Drowns & Pyke, 2002; Lim et al., 2006).
7. Disengagement, where students stop working with the technology and maintain ‘inattentive, purposeless, disinterested tinkering with software elements’ (Bangert-Drowns & Pyke, 2002, p. 25).

In their study into student engagement with educational technology, O’Brien & Toms (2008) found that the process of engagement is composed of four stages:

1. Point of engagement: Student engagement is initiated through interaction with the user interface – the more pleasing and usable it is, the more engaged the student becomes. Pilke (2004) reveals one of the most common obstacles to flow is ‘insufficient skill in using the user interface’ (p. 354).
2. Period of sustained engagement manifested through emotional and behavioural indicators as abovementioned.

3. Disengagement: This occurs when students decide to stop the activity or when external factors cause them to stop. This period is associated with negative feelings of frustration, uncertainty, being overwhelmed by challenges or information, loss of interest or motivation, and lack of novelty or challenge. It occurs when students go off-task (Lim et al., 2006).
4. Reengagement is usually initiated by the teacher. If reengagement occurs outside of the classroom, students do so voluntarily, indicating a positive past experience.

4.4 DIGITAL LANDSCAPE IN IRISH PRIMARY SCHOOLS

Technology infrastructure levels in Irish schools are close to EU and OECD average levels (Butler et al., 2013). In terms of Internet connectivity, broadband has been rolled out across all post-primary schools and it is expected that all primary schools will be connected by 2020 (DES, 2015). Technical support is the main concern, however (Butler et al., 2013). The DES is currently evaluating several solutions and funding options for schools nationwide (DES, 2015). The DES also recognises the dearth of digital resources available to teachers and advocates teacher-and-student-generated content in a bid to move away from the overreliance on textbooks and worksheets (DES, 2015). Continuous professional development courses in technology use in Irish primary school classrooms are technology-centred, however, and need to become more pedagogically oriented (Butler et al., 2013).

In 2008, the DES (2008) endorsed technology in the classroom as a way of providing ‘teachers with a range of new tools to facilitate traditional pedagogies’ (p. 5). Its view has subsequently changed since then as it now promotes constructivist strategies to integrate technology into teaching and learning (DES, 2015). In its report entitled Digital Strategy for Schools 2015-2020, the DES (2015) outlines its vision for integrating technology into primary school classrooms in order to ‘enhance teaching, learning and assessment so that Ireland’s young people become engaged thinkers, active learners, knowledge constructors and global citizens to participate fully in society and the economy’ (p.5). This strategy is a localised and adapted version of the UNESCO ICT Competency Framework for Teachers, which emphasises technology literacy, knowledge deepening and knowledge creation (DES, 2015). The DES (2015) acknowledges the importance of 21st century learning skills to develop students’ ability in higher-order thinking, creativity and

collaboration, and encourages teachers to take a facilitative role, providing guidance and feedback while engaging students in collaborative activities.

4.5 BARRIERS TO TECHNOLOGY INTEGRATION

Johnson et al. (2014) state that teachers are expected to be digitally competent and adept at facilitative pedagogical constructivist practices, however, 35% of European students across all grades have never used technologies in their learning (Butler et al., 2013). Barriers to technology integration in the classroom exist (Ertmer, 2005; Johnson et al., 2014; Mumtaz, 2000) such as (Ertmer, 2005):

- Access to technology resources;
- Access to technical and administrative support;
- Access to professional development opportunities;
- Traditional pedagogical beliefs;
- Teaching experience and competence with technology; and
- Curricular pressures.

Ertmer (2005) categorises the initial three barriers as first-order barriers to change and the latter three as second-order barriers to change.

4.5.1 FIRST-ORDER BARRIERS

Ertmer (1999) describes first-order barriers as being extrinsic to teachers as they are outside of their control in terms of availability of infrastructure and resources. Learning new technology skills and pedagogical practices can be challenging and time-intensive (Koehler & Mishra, 2009), especially when teachers have limited time and resources available to them for actual implementation (Edelson & Reiser, 2006; Hoban et al., 2007). Nonetheless, O'Shea and Koschmann (1997) believe that many educators are receptive to new technology in their classrooms but that they need practical assistance in doing so. Teacher training and professional development courses tend to be technocentric (Johnson et al., 2014) and do not focus on the pedagogical knowledge required to integrate technologies into teaching practice (Butler et al., 2013; Ertmer, 1999; Higgins et al., 2012; Mishra & Koehler, 2006). Koehler & Mishra (2009) emphasise the importance of teachers developing TPACK for effective teaching with technology and suggest such courses adopt a learning-by-design approach, where teachers learn about 'educational technology by engaging in

authentic design tasks in small collaborative groups' (Mishra & Koehler, 2005, p. 99). Ertmer (1999) also recommends co-researching and conference attendance as ways of learning new approaches and skills.

The physical space available to teachers is another barrier to technology integration (Tondeur et al., 2015). Cluster typology, portable whiteboards and more, better-positioned, electrical sockets are conducive to constructivist uses of technology (Tondeur et al., 2015). Tondeur et al. (2015) observed seating arrangements in 105 classrooms across 12 Belgian schools. They found that 28% of classrooms had a layout of front-facing pairs and only 12% had cluster topologies. They observed more computers in classrooms with cluster arrangements (4%) compared to front-facing pairs (2%). They also observed that nearly all classrooms (98%) had at least one computer, with the average classroom having between two and three computers. They noted that 80% of whiteboards were situated at the top of the classroom and 49% of computers were located at the back of the classroom.

4.5.2 SECOND-ORDER BARRIERS

Second-order barriers are intrinsic to teachers' values and competence (Ertmer, 1999). A teacher's pedagogical philosophy and beliefs influence the success of technology integration in the classroom (Becker, 2000; DES, 2015; Ertmer, 2005; Volman, 2005). VanderArk & Schneider (2012) caution that 'layering technology' on top of traditional instructional approaches will not contribute to deeper learning (p. 24) compared to using it in a more constructivist way (Volman, 2005; Cummins, 2008; INTO, 2011).

Teacher confidence and competence using technology enables integration as they are better able to identify which technologies support specific curricular goals (Ertmer et al., 2010; Howard, 2013). Howard (2013) believes that teachers' resistance to technology integration is often due to a combination of negative feelings about technology and an aversion to risk-taking in teaching. Teachers gain this through successful experiences (Ertmer et al., 2010), however, starting small and building up to more productive tasks (Ertmer, 2005). In order to entice more teachers to use technology in the classroom, Mumtaz (2000) calls for more research involving 'innovations in the use of technology that have been implemented and studied over

several years' (p. 338). Gilbert (2002) promotes the use of Low Threshold Applications¹⁴ (LTAs) in encouraging teachers to use technology. LTAs are educational technology applications that are accessible; low in cost or free; easy to learn; easy to use; non-threatening; and can be relied upon to work as expected.

Curriculum is often seen as a barrier to technology integration (Ertmer, 2005). Teachers have limited instructional time and how they use it is always a concern (O'Donnell, 2004). They feel the need to 'stick to the rutted path of established curriculum' (Wiske et al., 2001, 484) and often lament the fact that it contains so much material (Hoban et al., 2007; Papert, 1993a). They feel considerable pressure and accountability to complete its requirements (Applefield et al., 2001; Becker, 2000; Stone Wiske et al., 2001; Sylvester & Greenidge, 2009). A concern for many teachers is that classroom interaction around technology may interfere with teacher-controlled instruction (Wells & Arauz, 2006). Nonetheless, exemplary teachers favour depth over breadth in terms of curriculum coverage (Becker, 2000).

4.6 CONCLUSION

This chapter discusses the importance of engagement in learning as it enhances learning achievement in the classroom (Bangert-Drowns & Pyke, 2002; Nelson et al., 2009; Sandholtz et al., 1994). Technology can serve as a hook to attract and maintain such engagement throughout the learning process. The researcher has described the three constructionist tools employed in this study as a means to integrate technology pedagogically into the language classroom and as a way to sustain student engagement in their learning. She has also outlined the digital strategy advocated by the DES and provided an overview of the digital infrastructure and resources available to Irish primary school teachers. Finally, she revisited the digital native argument before discussing common barriers to technology integration in the classroom.

¹⁴ <https://campustechnology.com/articles/2002/02/the-beauty-of-low-threshold-applications.aspx>

Studies in literacy have long been informed by theories of ‘acquisition, cognition and individual achievement’ (Rowse & Pahl, 2015, p. 1). Rowse & Pahl (2015) argue that ‘literacy practices are vernacular, networked and embodied’ and should therefore be informed in more innovative ways (p.1). Most research in language learning is experimental in nature (Norris & Ortega, 2000) and most research conducted into Irish-language acquisition focuses on the teaching of Irish reading (Walsh & Cassidy, 2003). This study is concerned with the holistic development of all language skills, as well as enhancing student attitudes towards the Irish language. The Royal Irish Academy calls for new technologies to be integrated into Irish-language teaching (RIA, 2011) as they can enliven the act of language learning, making it more enjoyable, interesting, engaging and relevant to students (Ó Duibhir & Cummins, 2012; RIA, 2011).

The Swiss educationist, Johann Pestalozzi (1746-1827) believed that learning was a result of a balance between heart, head and hand (Hall, 2011; Martinez & Stager, 2013). Intertwining the TPACK framework, design-based learning activities and constructionist technologies promotes meaningful authentic learning in the language classroom and culminates in a shareable digital artefact. The process of learning is made visible, providing teachers with opportunities to observe and scaffold student learning as required (Martinez & Stager, 2013). Students work in collaboration as opposed to working alone; they learn skills in context as opposed to in isolation; and the focus is on understanding as opposed to memorisation.

5 CHAPTER FIVE: RESEARCH METHODOLOGY

5.1 INTRODUCTION

In this chapter, the researcher first describes her conceptual framework and her process of inquiry. She then discusses the methodological approach she undertook in this study, which incorporated ethnographical, design-based research and mixed methods approaches. She then proceeds to discuss her rationale for selecting each of her research collection methods, along with their strengths and weaknesses, and draws on triangulation as a means to fortify the data she yielded from observations, interviews, questionnaires, student feedback sessions and language tests. She also discusses the validity, reliability and ethical procedures she implemented in this study. Finally, the researcher describes the methods she employed to analyse her research data, namely thematic and descriptive data analysis. As aforementioned, the researcher implemented an instructional intervention to investigate the potential of digital storytelling and animation tools to enhance students' attitudes towards and abilities in the Irish language, and their potential to promote a student-centred, collaborative, technology-enhanced, knowledge-construction language learning environment. The study draws on ethnographic approaches as students were observed in the natural setting of their classroom. Design-based research guided this intervention through three iterative cycles in which students of one intact class participated in language-learning activities over the course of one academic year.

This study was conducted within a pragmatic paradigm where theory produces change (Barab & Squire, 2004) and transforms the learning context (Barab & Squire, 2004; Collins et al., 2004). Mixed methods were employed to gather qualitative and quantitative data from teacher and student groups to 'support and inform each other' (Dörnyei, 2007, p. 42) and to capture a 'more complete, holistic, and contextual portrayal' of the phenomenon being studied (Jick, 1979, p. 603). The questionnaire study, a smaller yet significant part of the study, served to reinforce the larger classroom intervention study and provided 'a more complete understanding' (Onwuegbuzie & Leech, 2005, p. 380) of Irish-language teaching and learning in primary schools nationwide. The researcher believes that all methods chosen for this

study were ‘fit for the purpose of the research’ undertaken (BERA, 2004, p. 11) and this was further reinforced by the National University of Ireland, Galway granting her ethical approval prior to commencing data collection procedures.

5.2 CONCEPTUAL FRAMEWORK

This section outlines the process of inquiry undertaken by the researcher in this study and the conceptual framework that underpins it in terms of epistemology, ontology and research paradigm. Pragmatism is the overarching worldview that guides this study where knowledge is seen ‘as being both constructed and based on the reality of the world we experience and live in’ (Robson, 2011, p. 28). Even though the researcher states her ontological and epistemological position, ‘workable approaches to problem solving’ remain to the fore (Morgan, 2013, p. 1054). Biesta & Burbules (2003) believe educational research ‘is not so much research *about* education as it is research *for* education’ (p. 1). Teachers expect educational research to generate relevant knowledge that ‘can inform their actions and activities’ in the classroom (Biesta & Burbules, 2003, p. 1). The researcher believes that this study will indeed contribute to existing knowledge and enlighten Irish-language teachers and learners in their endeavours in the classroom. The following chapters explore this contribution in greater detail.

5.2.1 PROCESS OF INQUIRY

Dewey (1910) describes ‘the process of thinking’ (p. 68) as comprising of the following distinct stages:

- (i) a felt difficulty; (ii) its location and definition; (iii) suggestion of possible solution; (iv) development by reasoning of the bearings of the suggestion; (v) further observation and experiment leading to its acceptance or rejection; that is, the conclusion of belief or disbelief (p. 72).

Biesta & Burbules (2003) refer to Dewey’s process of thinking as ‘the process of inquiry’ (p. 57). The researcher approached her study in a stepwise manner reflecting Dewey’s pragmatic approach. The diagram below illustrates the stages involved and

is based on Dewey's (1910) seminal work and on further research conducted thereafter by Biesta & Burbules (2003) and Morgan (2014).

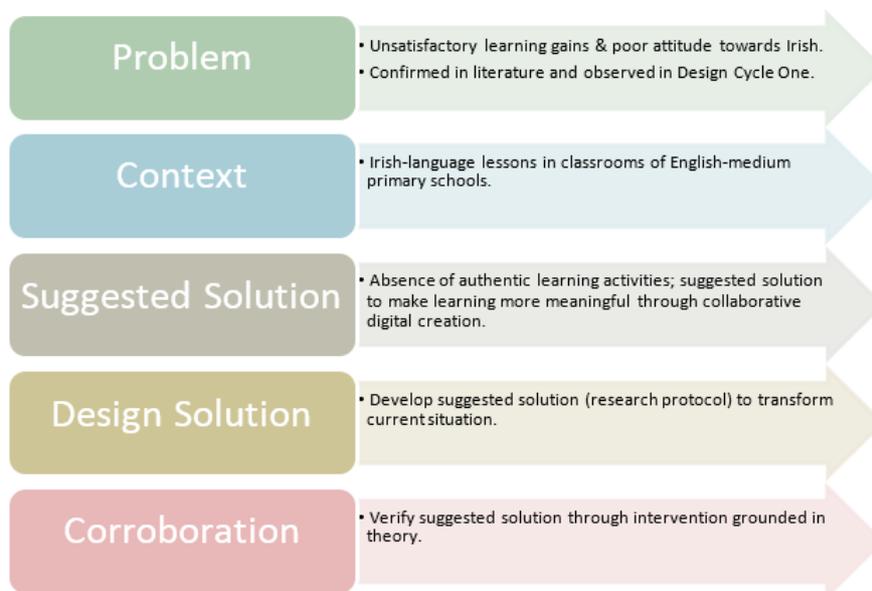


Figure 5.1: Process of Inquiry

In their discussion of Dewey's pragmatism, Biesta & Burbules (2003) emphasise that 'educational research can only ever show us what has been possible in a specific situation...but it can never tell us once and for all what to do' (p. 110). Robson (2011) reminds us that pragmatism endorses fallibilism where 'research conclusions are rarely, if ever, viewed as perfect, certain or absolute' (p. 28). The researcher does not proffer a prescription or 'recipe' (Biesta & Burbules, 2003, p. 111), but instead provides guidelines or 'possible lines of action' (ibid, p. 110), which practitioners can employ in their Irish-language lessons. She proposes her TALEs framework to guide learning in the Irish-language classroom. She believes that all classrooms are unique, however, and that her model may need to be adapted to suit specific circumstances.

5.2.2 RESEARCH PARADIGM

Morgan (2014) views a paradigm as a set of beliefs or a school of thought where ‘worldviews and social contexts...have widespread impacts on the conduct of inquiry’ (p. 1052). Jackson (2013) understands a paradigm as one that guides the study in terms of what knowledge is and how we create new knowledge. According to Mackenzie & Knipe (2006), a paradigm ‘influences the way knowledge is studied and interpreted’ (p. 194). Without a paradigm, ‘there is no basis for subsequent choices regarding methodology, methods, literature or research design’ (Mackenzie & Knipe, 2006, p. 194). Defining this research study within a paradigm is of utmost importance to the researcher as she sees it as a way of firming her inquiry in terms of rigour and validity.

Quantitative and qualitative research paradigms are often viewed as traditional research paradigms and purists in their respective fields believe they should not be mixed (Johnson & Onwuegbuzie, 2004). Quantitative researchers support a positivist philosophy, while qualitative researchers align themselves with a constructivist/interpretivist philosophy (ibid). Morgan (2014) states, however, that ‘there may be an affinity between paradigms and methods, but there is no deterministic link that forces the use of a particular paradigm with a particular set of methods’ (p. 1045). Rather than assigning ontological and epistemological values to paradigms, a pragmatist creates her ‘own world of research’ (Morgan, 2014, p. 1050), within which ‘multiple assumptions and diverse methods can comfortably reside’ (Greene et al., 2005, p. 275). The research problem is the fundamental concern and ‘data collection and analysis methods are chosen as those most likely to provide insights into the question with no philosophical loyalty to any alternative paradigm’ (Mackenzie & Knipe, 2006, p. 196).

Pragmatism emerged from the writings of three American philosophers: Charles Sanders Peirce, William James and John Dewey (Biesta & Burbules, 2003). Dewey’s pragmatism deals with ‘questions of knowledge and the acquisition of knowledge within the framework of a philosophy of action’ (Biesta & Burbules, 2003, p. 9). It is this relationship between action and knowledge that results in a practical approach to educational inquiry (ibid; Johnson & Onwuegbuzie, 2004). Pragmatism places theory ‘squarely into the world of action and experience’, engaging with the complexity of the situation (Confrey, 2006, p. 139). It provides a platform for mixed

methods of data collection and analysis and different worldviews (Creswell, 2010; Robson, 2011). Nonetheless, it is important to defend the ‘construction of data to make the case that the records are adequate and appropriate to inform the research questions’ (Hammer & Berland, 2014, p. 39).

5.2.2.1 ONTOLOGICAL PERSPECTIVE

Every paradigm holds an ontological position. Ontology is the philosophical study of the nature of reality (Bahari, 2012; Jackson, 2013). In terms of education, it is the philosophical study of the ‘nature of educational reality and how there may be different perceptions of what is known’ (Jackson, 2013, p. 52). Reality can be viewed as being external, objective and independent of the researcher, or it can be viewed as being subjective, experienced and constructed through human relationships (Jackson, 2013). The way in which we view reality depends on our philosophy of science. Realists maintain that reality is objective while relativists claim that reality is ‘what the community says it is’ (Reeves et al., 2005, p. 100).

The researcher believes that reality is of a subjective experiential nature and this, in turn, has influenced her selection of research methods employed in this study. The ontological assumptions on subjectivist approaches are that ‘reality is made up of social interactions and beliefs of the social actors’ (Bahari, 2012, p. 23). It is important to consider the ‘desires, beliefs, goals [and] reasoning processes’ of students as they engage in their learning and to document this learning as it develops over the course of the study (Shavelson et al., 2003, p. 27). The researcher uses participants’ own words to reflect their multiple realities (Bahari, 2012). Qualitative instruments are predominantly employed to better understand the words, experiences and actions of research participants (Gibbs, 2007), while quantitative instruments are used to strengthen and triangulate these data (Johnson & Onwuegbuzie, 2004).

Experimental studies revealing the lack of impact of technology on learning are mostly due to research being grounded in a realist philosophy of science where an objective reality exists (Reeves et al., 2005). Media comparison studies using quasi-experimental methods, in particular, have dominated the field of educational technology for many decades (ibid). Such research approaches measure the hidden mental change in student learning from before and after an intervention through pre-

tests and post-tests (Stahl, 2012). As aforementioned, the researcher assumes reality is subjective and undertakes a predominantly qualitative approach in her quest to enhancing students' experience in the Irish-language classroom by engaging them in the joint creation of digital learning artefacts. Her aim is not to compare technologies and pedagogies, but to portray how each type of technology and pedagogical approach plays a role in enhancing learning and teaching. She becomes immersed in the field and grows close to the participants in order to gain a deep understanding of their world (Bahari, 2012). Such ethnographic approaches attempt to describe and interpret events from within the society being observed, not from an objective science or that of the researcher's own culture (Mehan, 2008).

5.2.2.2 EPISTEMOLOGICAL VIEWPOINT

Paradigms also maintain an epistemological position. According to Papert (1993b), epistemology is the 'theory of knowledge' (p. 162) and it concerns the philosophical study of knowledge (Jackson, 2013). According to Braun & Clarke (2006), an epistemology 'guides what you can say about your data, and informs how you theorise meaning' (p. 90). A researcher can take an objective stance whereby she limits her effect on outcomes, or she can actively co-construct knowledge with others. In keeping with her subjective ontological standpoint, the researcher views knowledge through the lens of interpretivism and constructivism. An interpretivist researcher tends to rely upon the 'participants' views of the situation being studied' (Creswell, 2010, p. 8) while they make meaning in and through their activities (Cohen et al. 2011). The researcher is interested in 'interpreting deeper meaning in discourse that is represented in a collection of personal narratives or observed behaviours and activities' (Guest et al., 2012, p. 5). Constructivism stresses that the 'world we experience arises from multiple, socially constructed realities' (Gibbs, 2007, p. 7). Constructivists 'cannot say how the world is, only how some people see it' (ibid). According to Mehan (2008), researchers do not simply observe and report 'brute facts', they 'mold materials into interpretations' (p. 82).

As aforementioned, quantitative data contribute to this study in order to reinforce qualitative data (Mackenzie & Knipe, 2006). Quantitative methods are associated with post-positivism (Guest et al., 2013). Guest et al. (2013) advocate that ‘post-positivists accept the premise that a completely objective reality is impossible to apprehend but assume that research accounts can approximate, or at least attempt to approximate, an objective truth’ (p. 7). Jackson (2013) also states that no approach is completely objective as the researcher makes subjective decisions at all levels.

5.2.2.3 SUMMARY OF CONCEPTUAL FRAMEWORK

To summarise, this study was conducted within a pragmatic paradigm. It is framed by the ontological belief that the nature of reality is subjective and the researcher’s epistemological stance is constructivist and interpretivist in nature. The study draws on ethnographic approaches where an intervention is implemented in the classroom using a design-based research approach. A mixed methods typology design is employed to collect and analyse quantitative and qualitative data via a classroom intervention and a national teacher questionnaire. The following section explores her research design in detail. The diagram below illustrates the researcher’s philosophical underpinnings and resulting methodological approach to inquiry.



Figure 5.2: Research Paradigm

5.3 RESEARCH APPROACH

The nucleus of this study, the classroom intervention, draws on design-based research (DBR) to guide the intervention and ethnographic approaches where the researcher observed and participated in language-learning activities. While ethnographic research yields rich descriptions of a specific occurrence (Collins et al., 2004), DBR goes beyond ethnographic research and builds upon it (Mehan, 2008), hence her rationale for employing both approaches. In the following sections, the researcher first describes her ethnographic approach, followed by her DBR and mixed methods approaches. She provides a brief background to DBR as it is a relatively new approach in education research and in language-learning research in particular.

5.3.1 ETHNOGRAPHIC APPROACH

Ethnography involves studying a ‘holistic perspective’ of a phenomenon (Guest et al., 2012, p. 11) through ‘seeking an emic, or insider’s perspective’ (Bloome & Green, 2015, p. 23) by ‘getting inside’ it (Creswell, 2003, p. 44). Ethnographic research attempts to ‘characterize relationships and events’ that occur in particular settings and yield rich descriptions making it possible to ‘understand what is happening and why’ (Collins et al., 2004, p. 21). The researcher observed students and their teacher as they engaged in Irish-language learning activities in their own classroom. Cazden (1979) refers to studies of language learning in the classroom as microethnographies as ‘the unit is a classroom rather than a culture’ (p. 1). Flewitt et al. (2015) refer to it simply as classroom ethnography. It is important to clarify that this study reflects a more ‘contemporary use of ethnography’ (Flewitt et al., 2015, p. 12) as it was not feasible to be present for every Irish-language lesson delivered during the academic year. The researcher was present for two of the four lessons each week. In these lessons, the teacher and researcher employed an innovative approach to language learning, while the teacher utilised a more traditional approach in the remaining two lessons. This is discussed in more detail in the following chapter.

Ethnography involves a ‘constant process of decision-making’ and the researcher must always be open to changes in her research design (Goldbart & Hustler, 2005, p. 18). Data collection and analysis are interrelated and ongoing throughout an ethnographic study (ibid). Ethnography is predominately a qualitative approach, but

it can also involve quantitative methods (Guest et al., 2012). The classroom intervention study involved the collection of data in multiple formats including video and audio recordings; field notes; transcriptions; and statistical values. These data represent meanings and experiences of research participants and provide a means to understanding the ‘social, cultural, and physical context in which behaviour occurs’ (Guest et al., 2012, p. 4).

Ethnographic approaches are appropriate for observing and analysing an intervention as it plays out in a particular classroom (Collins et al., 2004; Reinking & Bradley, 2008). Employed in this way, ethnographic data have a more pragmatic function – extending beyond rich descriptions of student learning to guide efforts in integrating an intervention into a classroom culture in order to accomplish a ‘valued pedagogical goal’ (Reinking & Bradley, 2008, p. 48).

5.3.2 DESIGN-BASED RESEARCH APPROACH

DBR is theoretically framed empirical research of pedagogical activity in the classroom (Bell, 2004; Fishman et al., 2013; McKenney & Reeves, 2012; Mishra & Koehler, 2006; Plomp, 2007; Sandoval & Bell, 2004). Learning is a ‘complex enterprise derived from a synergy of factors and interactions’ (Tabak, 2004, p. 226) and experimental studies cannot manage the many interacting variables in a classroom setting (Reinking & Watkins, 1996). Pitting instructional and media interventions against each other, therefore, has had little or no impact on learning (Palincsar & Ladewski, 2006; Reeves et al., 2005; Reeves, 2006; Reeves, 2011; Reinking & Bradley, 2008). Many are laboratory-based with participants being socially isolated and typically involve a single dependent variable whilst controlling all others (O'Donnell, 2004). Design experiments, in contrast, involve context-bound and messy classroom situations in which participants engage in social interaction and where multiple dependent variables come into play (Collins et al., 2004; Kali, 2008; O'Donnell, 2004; Tabak, 2004; Van den Akker et al., 2006). Hoadley (2004) reminds us that educational researchers cannot control for students' prior experiences, nor can they ensure that a treatment will be identical across multiple situations. Dede (2004) notes the lack of experimental control in a DBR study, but declares that neither is it a freewheeling intervention as all methods and approaches are guided by theoretical conjectures (Brown, 1992; Dede, 2004; Edelson, 2002).

An intervention is exploratory, iterative, flexible and adaptable in nature, and results in several design cycles (diSessa & Cobb, 2004), typically three (Anderson & Shattuck, 2012). This approach of continuous progressive refinement in design, where each cycle informs the next, leads to more robust designs and better learning (Collins et al., 2004; Fishman & Krajcik, 2003; Joseph, 2004; Knowlton, 2007; Penuel et al., 2011; Walker, 2006; Shavelson et al., 2003). The final design cycle culminates in a practical innovation, local instruction theories and a set of design principles guiding implementation in other classrooms (Anderson & Shattuck, 2012; Gravemeijer & Cobb, 2006; Penuel & Frank, 2016; Plomp, 2007; Reeves, 2000).

Innovations need to be valid, usable and effective (van den Akker, 2007), however, in order to work in other classrooms of ‘average students and teachers [and] supported by realistic technological and personal support’ (Brown, 1992, p. 143). Scaling up innovations to system-level is difficult, however, as it ‘demands alignment and coordination of the actions of people, teams, and organizational units within a complex institutional ecology’ (Penuel et al., 2011, p. 331).

In their systematic review of DBR, Anderson & Shattuck (2012) found that DBR is more commonly adopted in studies involving technological interventions; that science is the subject most researched in this way; and that the K–12 group is the most studied age group. According to Palincsar & Ladewski (2006), it is rarely used in literacy research, despite its roots in this type of research (Reinking & Bradley, 2008) when Ann Brown (1992) first introduced the idea of design experiments in reading comprehension studies. One of the main criticisms levelled against DBR is the issue of generalisation (Collins et al., 2004; Kali, 2008; Kelly, 2004; Shavelson et al., 2003; Sloane & Gorard, 2003) – a problem that is frequently associated with all education research (Collins et al., 2004). Generalisation in DBR involves case-to-case generalisation, which concerns the transfer of an innovation and its design principles to other classroom settings (Gravemeijer & Cobb, 2006; McKenney & Reeves, 2012). It is not based on statistical analysis but on a systematic and thorough analysis of longitudinal data, which in itself enhances credibility (Gravemeijer & Cobb, 2006).

DBR guided the researcher in developing her methodological approach (Hall et al., 2016) and in co-designing innovative language learning activities with the classroom teacher in order to enhance students' Irish-language learning experience. Biesta & Burbules (2003) believe that the relationship between educational research and practice is 'not one of application but of cooperation and coordination' (p. 108) and that it leads to the realisation of 'intelligent educational action' (Biesta & Burbules, 2003, p. 81), and hence the reason the researcher chose to conduct her study in this way. Rigorous analysis of the learning problem (Walker, 2006) and assessment of the local context (Anderson & Shattuck, 2012) are also important steps in this approach. Prior to implementing her intervention, the researcher reviewed the relevant literature and theories pertaining to technology-enhanced learning, language learning and Irish-language learning in particular. This research guided the enactment of her instructional intervention in the Irish-language learning classroom. She also observed the classroom teacher and students as they engaged in Irish-language learning activities. Understanding the 'messiness of real-world practice' (Barab & Squire, 2004, p. 3) is fundamental to this research approach as it guided the researcher in her endeavour to enhance the Irish-language learning experience.

5.3.3 MIXED METHODS APPROACH

Pragmatism is the paradigm underpinning this study and it emphasises the use of 'multiple tools of inquiry to gain different perspectives on the problem at hand' (Biesta & Burbules, 2003, p. 108). DBR studies typically involve mixed methods (Anderson & Shattuck, 2012; Ormel et al., 2012; Reinking & Bradley, 2008), which provide a fuller understanding of the research problem than either quantitative or qualitative methods could on their own (Dörnyei, 2007; Guest et al., 2012).

Quantitative researchers argue for objectivity and remain 'emotionally detached and uninvolved' with study participants (Johnson & Onwuegbuzie, 2004, p. 14). Such studies often involve large samples, efficient data collection and analysis techniques, and generalisable findings (ibid). Johnson & Onwuegbuzie (2004) caution, however, that these findings may not always be applicable to local contexts. Qualitative studies are based on the 'minimum distance between the investigator and the investigated, and seek multiple definitions of reality embedded in various respondents' experiences' (Sale et al., 2002, p. 49). Researchers try to make sense of the phenomena under investigation and interpret them contextually in light of the

participants' own perspectives (Johnson & Onwuegbuzie, 2004). Such studies are situated in local naturalistic settings and provide a thick description of an individual's personal experience of a phenomenon (ibid). Schreiber & Asner-Self (2011) describe thick description as the 'rich information that brings to life the scene you are describing' (p. 196). They result in large amounts of data, however, and collection and analysis methods can be time-consuming (Robson, 2011). Lack of generalisability of data is also viewed as a weakness, along with researcher bias (Schreiber & Asner-Self, 2011).

A mixed methods approach, combining both types of data, helps capture a more complete picture of the broader and local situation where 'words, pictures, and narrative can be used to add meaning to numbers [and] numbers can be used to add precision to words, pictures, and narrative' (Johnson & Onwuegbuzie, 2004, p. 21). The two most common mixed methods designs are sequential and concurrent (Guest et al., 2012; Greene, Kreider & Mayer, 2005). The former occurs chronologically where data analysis for one dataset type informs another (Guest et al., 2012). The latter occurs when datasets are independent of one another and are integrated at analysis stage (ibid). This research study is composed of two parts: a larger, more dominant, study involving a classroom intervention with third class students and a smaller, less dominant, study involving a national questionnaire aimed at primary school teachers. The researcher employed a sequential design where quantitative data from structured questionnaires and language tests informed qualitative data derived from participant observations, interviews and group feedback sessions (Onwuegbuzie & Leech, 2005).

In this way triangulation ensures weaknesses in one approach are counter-balanced by strengths in the other (Jick, 1979; Johnson & Onwuegbuzie, 2004). Onwuegbuzie & Leech (2005) refer to within-method triangulation, which involves the 'use of multiple quantitative or multiple qualitative methods' such as triangulating interview data with observational data (p. 379). The limitations of this approach 'lie in the use of only one method', however (Onwuegbuzie & Leech, 2005, p. 603), which is why the researcher also included between-method triangulation in her research design by incorporating questionnaire data with observational data, for example. Triangulation also promotes complementarity where results from several different methods are verified and corroborated by each other (Greene et al., 2005; Johnson &

Onwuegbuzie, 2004; Onwuegbuzie & Leech, 2005). In this respect, each research method represents a different perspective or lens 'to assess a given phenomenon in order to enhance confidence in the validity of the findings' (Greene et al., 2005, p. 274).

5.4 RESEARCH PARTICIPANTS

This study involved primary school teachers and students in English-medium schools. Students' parents were also involved in this study. The researcher focused on English-medium primary schools as students in this type of school make less satisfactory progress in Irish (Harris, 1982). She discusses her approach in selecting her research participants below.

5.4.1 STUDENT PARTICIPANTS

Student participants (27) were selected using a convenience sampling procedure. The researcher selected this particular group of students as they were the only group available to her in terms of long-term access over a complete academic year. Convenience sampling is a non-probability sampling method involving the selection of participants 'who happen to be available for study' (Mackey & Gass, 2010, p. 122). This is often utilised in a qualitative inquiry where the main goal of sampling is 'to find individuals who can provide rich and varied insights into the phenomenon under investigation so as to maximise what we can learn' (Dörnyei, 2007, p. 126). Dörnyei (2007) believes that the sample size for this type of research should include about 30 participants, which would roughly equate to the average class size. Students of one intact class engaged in innovative language learning activities and were video and audio-recorded. Student participants completed three questionnaires, two language tests and participated in eight group feedback sessions. These research methods measured opinions, thoughts, technology use, language achievement and motivational factors for engaging in learning.

5.4.2 PARENT PARTICIPANTS

Students' parents were invited to participate in this study. Parent participants were also selected using a convenience sampling procedure. The sample size included 30 parents. Parent participants completed one questionnaire at the end of the instructional intervention.

5.4.3 TEACHER PARTICIPANTS

Teacher participants were selected using purposive and convenience sampling strategies. Mackey & Gass (2010) define a purposive sample as one in which ‘researchers knowingly select individuals based on their knowledge of the population in order to elicit data in which they are interested’ (p. 122). A purposive sampling technique involving inclusion and exclusion criteria was employed to determine the sample for the teacher questionnaire. A purposive sampling procedure was also employed to determine the sample for the follow-up interview study based on predefined criteria such as geographical location and explicit data collected from the teacher questionnaire. A convenience sampling procedure was used to select the third-class teacher of the intact class of student participants abovementioned. This teacher was selected as she was the only teacher available to participate in this study. The convenience sampling technique was also used to select one more participant for the interview study, the sixth-class teacher, as he engaged in innovative language learning activities the year following the classroom intervention. Convenience sampling was also employed to select the fourth-class teacher. She completed a questionnaire concerning the third-class students the following year.

5.5 DATA COLLECTION METHODS

The data collection methods employed in this study include participant observation of Irish lessons; one-to-one semi-structured interviews with teachers; group feedback sessions with students; language tests; and an array of structured and semi-structured questionnaires aimed at teachers, students and parents. The researcher discusses each of her research methods in terms of rationale, strengths, weaknesses, design and implementation.

5.5.1 PARTICIPANT OBSERVATION

The researcher engaged in 30 participant observation sessions over a nine-month period, with each session lasting two hours. She employed video, audio and field notes to record each session. Participant observation has 'historically been an integral component of ethnographic inquiry' (Guest et al., 2012, p. 11) and is ideal for capturing ‘naturally occurring conversations’ (ibid) between ‘real people in real situations, doing real activities’ (Dufon, 2002, p. 44). The researcher is in fact the

research instrument and therefore requires great sensitivity and personal skills to conduct observations (Robson, 2011).

5.5.1.1 RATIONALE

The researcher undertook observation to initially get a sense of the teaching and learning processes in the Irish-language classroom (Jesse, 2001) and to later explore the potential of an innovative instructional approach to language learning via socio-constructivist and constructionist approaches. According to Jones & Somekh (2005), observation is ontologically determined as it depends on how the observer ‘conceptualizes the world and his or her place within it’ (p. 138). Due to the researcher’s philosophical underpinnings and pragmatic approach to inquiry (Greene et al., 2005), she chose an unstructured approach to participant observation as opposed to a more structured one where the observation is organised ‘around a schedule prepared in advance’ (Jones & Somekh, 2005, p. 139). In keeping with her interpretivist beliefs, she immersed herself completely and participated fully in all innovative activities and focused ‘on collecting as full a record as possible of words and behaviours’ (ibid). She started ‘out as a tourist’ and gradually learned ‘the rhythms of the classroom’ (Jesse, 2001, p. 2). She believed that it was more ethical to become involved in classroom activities in this way rather than remaining on the periphery looking in (Robson, 2011).

5.5.1.2 STRENGTHS

Robson (2001) reveals that generating data on ‘social interaction in specific contexts, as it occurs, is superior to retrospective accounts’ (p. 145). Through participant observation, the researcher was able to fully immerse herself into classroom activities and engage with the students, the teacher and the language-learning activities in a way that interviewing or surveying could not facilitate (Guest et al., 2012). Guest et al. (2012) emphasise that one of its most important strengths is its power to produce ‘penetrating insights and highly contextual understanding’ (p. 76).

5.5.1.3 WEAKNESSES

Since data were generated in a relatively unstructured and naturalistic way, and the analysis of video and audio data was interpretive, validity of data may be questioned. Video and audio recordings provide ‘denser linguistic information’ compared to note taking, however (Dufon, 2002, p. 45). The option of replaying video segments also enhances data validity as it provides ‘more time to contemplate, deliberate, and ponder the data before drawing conclusions’, and hence serves to ‘ward off premature interpretation of the data’ (ibid). Guest et al. (2012) believe that since the researcher has directly experienced the phenomenon, she is ‘capable of taking positions’ about the meaning of her data with confidence that she is ‘getting it right’ (p. 80). Using claims generated in situ to inform broader practice is difficult (Barab & Squire, 2004), especially when data are gathered from a small convenience sample and are therefore impossible to generalise to a wider population (van den Akker, 2007), leaving the interpretation of the findings ‘open to challenge’ (Guest et al., p. 84). The researcher anticipates that her rich description of the ‘process-in-context’ (van den Akker, 2007, p. 49) will increase the ecological validity and replicability of her findings so that other teachers and researchers can transfer her resultant design principles to their own contexts.

Video recording can ‘capture only what is observable [and] unspoken thoughts and feelings of a participant cannot be seen or heard’ (Dufon, 2002, p. 45). The researcher designed her research protocol in light of this weakness, where student feedback sessions and questionnaires and teacher interviews triangulated participant observations and enabled her to capture important data that would have otherwise gone unnoticed in her observations. Participant observation also requires a substantial commitment in terms of time, effort, travel, recording, storage and analysis. The researcher was aware of this at the initial stages of designing her research protocol and committed fully to this process of inquiry. The researcher also implemented efficiencies in her data collection approach such as organising and systemising her data as she gathered them – filing, scanning, uploading, backing up and transcribing them as they were collected in order to conduct preliminary analysis, which later informed instructional approaches in subsequent design cycles.

Another consideration is reactivity in terms of the ‘extent to which an observer affects the situation under observation’ (Robson, 2011, p. 317). Goldman (2007) believes that it is better ‘to accept the performative actions we demonstrate whenever we are being observed’ rather than to dismiss its use entirely (p. 5). The researcher noticed that it was the presence of her recording equipment that seemed to distract students initially, and not so much her presence per se. This subsided with time, however, as students became less interested in talking into and playing with the camera.

5.5.1.4 APPROACH

After a brief period of direct observation, the researcher participated fully in all activities and became part of the classroom dynamic during Irish-language lessons. She maintained ‘the dual role of observer and participator’ during this time (Robson, 2011, p. 322). The students were aware of her background as a language teacher and viewed her in that same light. In addition to her role as a teacher, she also generated meaningful data by ‘fulfilling the role of researcher—taking notes; recording voices, sounds, and images; and asking questions that [were] designed to uncover the meaning behind the behaviors’ (Guest et al., 2012, p. 75). The researcher felt she was successful in building a rapport with the students and she felt that she enabled them ‘to act much as they would if the researcher were not present’ (ibid, p. 76).

5.5.1.4.1 ENTRY TO THE FIELD

Since the researcher’s focus was Irish-language learning via socio-constructivist and constructionist approaches within the context of the classroom, she opted to video and audio record her participant observation sessions. As Jones & Somekh (2005) state, observation becomes ‘a product of choices about what to observe and what to record’ (p. 138). The researcher had many decisions to make in order to ‘capture information unambiguously and as faithfully and fully as possible’ (Robson, 2011, p. 327). She let her research questions guide her observations in an attempt to capture key information and to impose some constraint on accumulating too many data. The camera focused on dyads of students during the storyboarding activity and on triads of students (including the original dyad) working together collaboratively during the digital creation activity. The camera followed the same dyad for two weeks at a time in order to acquire a complete picture of each two-week lesson. The design and

delivery of Irish-language lessons is described in detail in chapter 6, Intervention Overview. The researcher made ‘a conscious effort to distribute [her] attention widely and evenly’ (Robson, 2011, p. 327) while keeping her research questions to the fore. All students were recorded on camera at some stage during the participant observation sessions.

5.5.1.4.1.1 EQUIPMENT

The researcher used an iPad to video record her observation sessions. It was fitted into a special adaptor¹⁵ and mounted on a small and lightweight tripod¹⁶. This took up very little room in the classroom. It was easy and quick to assemble and pack up, and was highly portable for her trips to the school. She attached an external wide-angle lens to the iPad, as well as an external directional microphone that suppressed sound from the side (Hall, 2007). She also used her iPhone to audio record group activity as surrounding noise from neighbouring groups tended to drown out voices in the video recordings, despite her use of a directional microphone.

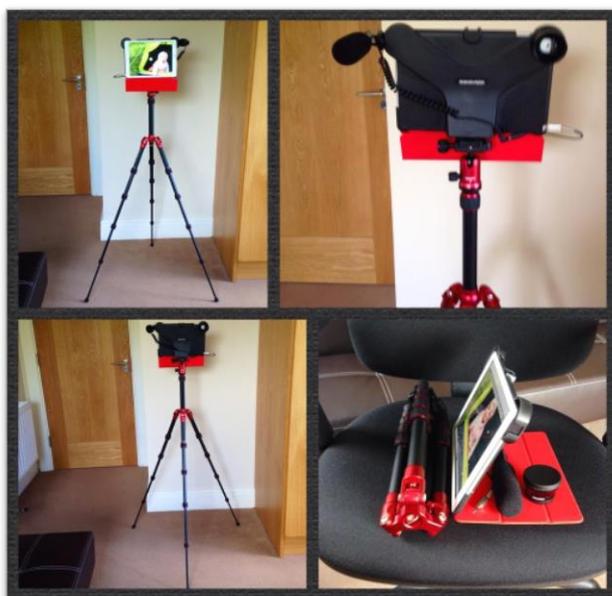


Figure 5.3: Recording Equipment

¹⁵ <https://www.makayama.com/>

¹⁶ <https://www.mefoto.com/>

5.5.1.4.2 ON SITE

Informed consent and explicit permission to record were obtained from the students, their parents, the principal and the class teacher prior to entering the field. The teacher had access to all video footage via a secured shared folder on DropBox – an online cloud storage facility. The reason for this was twofold. Firstly, the teacher was not only a participant in this study, but she also fulfilled the role of co-researcher. Secondly, it was significant to her professional development and reflection to have access to this footage (Jewitt, 2012).

Building a rapport with participants takes time and it is more beneficial to ‘gradually build from a mostly observer role toward more active participation’ (Guest et al., 2012, p. 91). The researcher mostly observed for the first six weeks before steadily immersing herself into classroom activities. She became familiar with observation techniques, classroom organisation, teaching styles and learning practices during this time (Goldman & McDermott, 2007). As the intervention progressed, the researcher sought to collect both linguistic and interactional data while students collaboratively created digital and animated stories in and through the target language. Jewitt (2012) notes how video is particularly useful ‘when exploring the social organisation and unfolding of interaction over time’, especially when ‘interaction with objects and other forms of multimodal communication’ are of interest (p. 7).

A video camera cannot record everything, however, and decisions need to be made as to what the lens frames (Jewitt, 2012). The researcher was aware that when the camera pointed in one direction, it screened out a considerable amount of activity elsewhere (Jones & Somekh, 2005). This partiality of video data, where elements are included and excluded, can be constraining. Dufon reminds us, however, that ‘even the human eye has a limited range of view and cannot take in everything that is happening in a scene’ (2002, p. 46). The researcher viewed this limitation positively, however, as it focused her camera lens on events concerning her research questions (Jewitt, 2012). Video data can result in a large collection of rich data, which can be time-intensive to code and analyse (Guest et al., 2012; Jewitt, 2012). Keeping her research questions to the fore helped her to maintain perspective and prevented her ‘from getting lost in detail’ (Barron & Engle, 2007, p. 33). Jewitt (2012) believes that this approach also prevents an ‘overly descriptive and weak analysis’ (p. 6).

Video data are subject to misinterpretation and bias as data are ‘always subject to some degree of personal framing of what the researcher experiences’ (Goldman, 2007, p. 16). He believes, however, that we should simply ‘accept and appreciate’ this (ibid). Goldman (2007) developed a set of heuristics to guide researchers in video ethnography and the researcher employed many of these in her observations. In keeping with her first two heuristics – Wholeness/Particularity and Being there/Being with, the researcher ensured that each video recording was sufficiently detailed to capture the core of the event and to bring the viewer inside it. Her third heuristic, Perspectivity, guided the researcher in capturing the multiple points of view of participants. In accordance with her fourth heuristic, Authenticity, the researcher captured activities as they unfolded and aimed to ‘shed new light’ as she interpreted these data (p. 31). The fifth heuristic advanced by Goldman (2007) is Chronological Verisimilitude and represents the order of events, not necessarily chronologically, but in a way that enables the viewer to comprehend events in a manner that is ‘in sync with the meaning of events’ and are ‘truthlike’ (p. 31).

In line with these heuristics and following the advice of Jewitt (2012) and Dufon (2002), the researcher moved the camera very little during classroom observations, thereby minimising distraction. She positioned the camera facing the whiteboard to record instruction and to record groups of students at work on the teacher’s computer. This location also enabled the researcher to record computer activity projected onto the whiteboard. She used wide-angle views to capture as much information as possible (Jewitt, 2012; Dufon, 2002). In order to limit the effect of the camera, the researcher switched it on before students entered the classroom and framed the image. She set the camera up ‘to run continuously to capture an outside-in view of the whole scene’ (Hall, 2007, p.8). She did not need to operate the camera during the recordings and instead opted for long-takes of each session (Sharan & Shachar, 1988). She rarely panned or zoomed during recordings as per Hall’s (2007) recommendation. She switched off the camera once the activity finished ensuring that each session had been recorded fully and was wholly presented.

Video footage was supplemented with audio recordings as the camera did not always capture student voices comprehensibly. The researcher augmented her data with field notes and attempted to write these immediately after each observation session, ensuring a more complete and accurate account (Guest et al., 2012). Field notes were important in this process as technology ‘only keeps a partial record’ and the researcher’s notes encompassed observations from other dyads and groups off-camera (Jones & Somekh, 2005, p. 140).

5.5.1.4.3 EXITING THE FIELD

The researcher decided to exit the field site as the academic year ended. Students were breaking from normal school routine as extracurricular activities such as sports’ days and school tours came into play. She also felt that she had enough data collected at that time.

5.5.2 QUESTIONNAIRE INSTRUMENT

The researcher designed six questionnaires for this study: a national teacher questionnaire, two student questionnaires, a parental questionnaire, a follow-up questionnaire aimed at the fourth-class teacher, and a follow-up questionnaire aimed at the fourth-class students (original student cohort). Each questionnaire is discussed at the end of this section and can be found in Appendix [B].

5.5.2.1 RATIONALE

A questionnaire is a survey tool employed to ‘examine the current state of something’ (Schreiber & Asner-Self, 2011, p. 206) and to ‘ask the same questions of all individuals in the sample’ (Gall et al., 1996, p. 289). The researcher’s aim was to explore thoughts and opinions of research participants in relation to current and innovative Irish-language learning activities in the classroom. Questionnaires are ‘used extensively in educational research to collect information that is not directly observable (Gall et al., 1996, p. 288). They can be used to quantitatively describe the characteristics, attitudes and opinions of a population by gathering data from a sample of that population. They can also provide qualitative data collected through voluntary information left in comment boxes.

5.5.2.2 STRENGTHS

Questionnaires are easy to design and offer respondents a greater degree of assurance in terms of anonymity and confidentiality compared to interviews and focus groups (Dörnyei, 2003). They can collect a large quantity of data in a short period of time, which can be analysed easily due to their quantitative nature (ibid).

5.5.2.3 WEAKNESSES

Questionnaires by their very nature yield surface information or 'limited richness' compared to the thick descriptions usually yielded from qualitative methods (Dörnyei, 2007, p. 135). The researcher integrated interview and feedback instruments into her research design to counter this weakness. Respondents are also prone to leaving out questions, either by mistake or because they do not like them (ibid). This emerged as an issue in her national teacher questionnaire. The researcher had little opportunity 'to double-check the validity of the answers' as she did when member checking interview transcripts (Dörnyei, 2003, p. 11). The only occasion she had to do so was in the follow-up interviews with three of her respondents. Social desirability bias can also influence the respondents, where respondents present themselves in a 'favourable light' (Robson, 2011, p. 316). She reduced the possibility of such bias by avoiding leading or loaded questions and double-barrelled questions¹⁷.

5.5.2.4 DESIGN

The researcher acted upon recommendations provided by Dörnyei (2007) and Gall et al. (1996) in designing her questionnaires. She paid particular attention to keeping instructions and questionnaire items short and writing them in simple, clear, concise and unambiguous language. She included the purpose of the study in her introduction. She organised the questionnaire into logical sections and varied the question formats in order to encourage respondents to think about each of their responses in turn.

¹⁷ A question containing several sub-questions (Dörnyei, 2010, p. 138).

5.5.2.5 IMPLEMENTATION OF THE NATIONAL TEACHER QUESTIONNAIRE

A semi-structured questionnaire was administered electronically to primary school teachers nationwide to elicit information regarding four specific areas of interest: general computer use; the integration of teaching and technology tools in general; the integration of technology tools in Irish-language teaching; and teaching and learning approaches in the classroom. Survey Gizmo¹⁸, an online survey application, was employed to facilitate this process. This application enabled the researcher to design an electronic questionnaire; to email the questionnaire URL to her sample; to enable participants to complete the questionnaire at a time and place of their own choosing; and to summarise and analyse her data. It took approximately fifteen minutes to complete. The teacher questionnaire was the largest of the five questionnaires in terms of question items and responses. It composed of 44 questions and three of the question items were open-ended questions. The remainder were closed questions requesting respondents to select an answer from a set of pre-prepared response options. Most question items included a text area for comments, however, which was at the discretion of the respondents to complete.

The researcher believed it would be overly ambitious and impractical in terms of time and cost to attempt to reach the entire population of primary school teachers in Ireland (N=30,358)¹⁹. However, she was eager to reach as much of this particular population as practical and felt that a smaller random sample of schools would not suffice. The researcher believed that more responses would provide for multiple perspectives. As per the Department of Education and Skills' (DES) website, there are 3145 primary schools nationwide (N=3145). This figure was the most current and up-to-date figure in relation to data on mainstream schools as of September 30th 2013. Her inclusion criterion encompassed English-medium schools and the exclusion criterion comprised of Irish-medium primary schools. Using school lists available on two Irish-medium educational websites: Gaelscoileanna Teo²⁰ and Eagraíocht na Scoileanna Gaeltachta Teo²¹, Irish-medium primary schools were identified via roll numbers, school names and email addresses. They were

¹⁸ <https://www.surveygizmo.com/>

¹⁹ According to the DES' website: www.education.ie/Primary-and-Special-Schools-List-2013-2014-Provisional.xlsx

²⁰ www.gaelscoileanna.ie

²¹ www.esg.ie

subsequently removed from the Excel sheet titled *Primary-and-Special-Schools-List-2013-2014-Provisional.xlsx*, retrieved from the DES website. The final sampling frame of English-medium primary schools included 2,879 schools (n=2,879). Ten of the schools in this Excel sheet did not list email addresses. Upon further exploration, the researcher discovered that these schools had been closed or had been amalgamated with other schools. Whilst acknowledging some of the limitations of this approach, given time and financial constraint this method of research design was deemed most appropriate for this inquiry.

The researcher emailed the principal of each school inviting them to partake in the study. This letter of invitation outlined the purpose of the questionnaire and asked the principal to forward the letter to all the teachers in their school, along with a set of instructions for participation. Every primary school teacher is an Irish teacher compared to post-primary schoolteachers who are subject specialists (Harris & Murtagh, 1999; Harris, 2005), hence justifying her reason for inviting all teachers in the sampling frame of schools to participate in her questionnaire study. This email contained an active link that took teacher participants to the electronic survey. The first question obtained the participant's consent to participate in the study. Upon completion, respondents received an email thanking them for partaking in the study. After a two-week interval, reminder emails were sent to those who had not yet responded in a bid to improve the response rate.

The researcher publicised her questionnaire study on Twitter during the Monday night Twitter educational chats #edchatie. She also reached out to the following organisations to advertise her questionnaire study:

- Irish Primary Principals' Network (IPPN), who published details in their monthly newsletter called eScéala;
- Computers in Education Society of Ireland (CESI), who posted information to their forum;
- Irish National Teachers' Organisation (INTO), who published details in their monthly newsletter;
- National Council for Curriculum and Assessment (NCCA), who were unable to help; and
- Professional Development Service for Teachers (PDST), who did not reply.

This questionnaire remained open for four months and yielded 668 responses; 450 of these had been completed in full, while 218 had been partially completed. A sub-sample of questionnaire respondents was selected and invited to participate in a follow-up interview, discussed below, to further explore topics discussed in their completed questionnaires. The researcher narrowed this sample to 284 respondents based on the technology competency level they indicated and their proximity to the researcher. One respondent was selected from each of the three technology competency categories – Average, Good and Excellent. Fourteen respondents selected Poor, but did not leave any contact details and therefore could not be approached. These three interviews explored their use of technology and the teaching and learning approaches they practised in their Irish-language classrooms.

5.5.2.6 IMPLEMENTATION OF THIRD-CLASS STUDENT QUESTIONNAIRES

The researcher administered two structured questionnaires to third-class students. The first one was administered in the computer room prior to the classroom intervention. This gathered data on students' knowledge and opinions in relation to technologies, and their usage in the classroom and in the home. It also sought their opinions in terms of learning Irish in school. The second one was implemented at the end of the intervention. This sought to gather evaluative information regarding the innovative activities in which they participated. It explored and assessed the effectiveness of the innovative instructional approaches and technologies during the three design cycles.

Both questionnaires were created and administered using an online application called Socrative²². This is an application for creating child-friendly quizzes. The first questionnaire composed of 22 questions, the second contained 30. All questions were closed-ended questions with the exception of the last question in each one. The first one yielded 27 responses indicating a 100% response rate. The second one yielded 26 responses. Each questionnaire was reviewed by the teacher and administered electronically in the computer room to all students present on the day. The teacher read each question and item response aloud in case students experienced

²² <http://www.socrative.com/>

any difficulties in reading them and reminded them to select the response that best described their feelings or opinions.

5.5.2.7 IMPLEMENTATION OF THE FOURTH-CLASS STUDENT QUESTIONNAIRE

The researcher administered a short unstructured questionnaire to the original cohort of students five months later, who were in fourth class at that time. It composed of four open-ended questions with a closed-ended question at the start. The questions gauged their opinions in relation to traditional and innovative approaches to learning Irish, and sought their advice for teachers and students of Irish. It yielded 26 responses.

5.5.2.8 IMPLEMENTATION OF THE FOURTH-CLASS TEACHER QUESTIONNAIRE

Six months later, the researcher administered a short structured questionnaire to the fourth-class teacher of the original cohort of students who had participated in the classroom study. She had initially requested an interview, but the teacher declined. It composed of ten closed-ended questions with an additional optional section for comments at the end. The questions gauged Irish-language learning ability and attitude, and whether she noticed a difference between her current and previous cohorts of fourth-class students in terms of attitude and ability. It yielded one response, as expected.

5.5.2.9 IMPLEMENTATION OF THE PARENTAL QUESTIONNAIRE

At the end of the classroom intervention study, the researcher wrote to each parent thanking them for their support during the year and conveyed to them what their children had accomplished in their Irish lessons. She also included a paper-based questionnaire for them to complete – this was reviewed by the teacher prior to distribution. It consisted of four closed-ended questions evaluating change in attitude and ability in Irish. It also queried whether their children enjoyed creating animations at home and if they had spoken more Irish than usual outside of the classroom. It included a comment box at the end for optional comments. It yielded 27 responses in total, indicating a 100% response rate.

5.5.3 INTERVIEW INSTRUMENT

The interview is the most commonly used method in qualitative inquiries (Dörnyei, 2007). The researcher conducted nine semi-structured interviews with teacher participants as part of this study.

5.5.3.1 RATIONALE

The interview enables interviewees to express their ‘view of a phenomenon in their own terms’ (Gall et al., 1996, p. 309) which is why the researcher convened them. She interviewed the third-class teacher of the intact class five times over a period of eighteen months prior to, during and after the intervention. Interview schedules one to five guided these interviews. These interviews explored the teacher's opinions, ideas and perspectives on technology use in the classroom, curricular approach and content, and innovative activities employed in Irish-language lessons. The researcher also interviewed the sixth-class teacher in the same school as he had adopted their innovative approach in his Irish lessons the following year, under the guidance of the third-class teacher. She sought evaluative information in this instance. Interview schedule six guided this interview. Three respondents from the teacher questionnaire participated in a follow-up interview; interview schedule one guided these interviews and again explored their technology use and curricular approaches in the Irish-language classroom. All six interview schedules can be found in Appendix [B].

5.5.3.2 STRENGTHS

An interview yields rich, descriptive data regarding a participant’s perspectives, views, experiences, thoughts, values and feelings – things we cannot observe (Gall et al., 1996; Wellington, 2000). It is an adaptable research instrument in that interviewers can pursue responses to ‘obtain more information and clarify vague statements’ (Gall et al., 1996, p. 289). Respondent validation through member checking enhances data as the researcher returns written transcripts to interviewees for confirmation and correction (Wellington, 2000).

5.5.3.3 WEAKNESSES

Interviews can be time-consuming to conduct and require good communication skills by both parties involved (Dörnyei, 2007). Social desirability bias can influence the interviewee as her identity is revealed to the interviewer and may lead to socially acceptable opinions and views emerging (ibid). The halo effect can also affect the validity of interviews when interviewees ‘provide information that they believe a researcher wants or expects’ (Mackey & Gass, 2010, p. 173). In addition, the ‘less articulate, shy interviewee may present the researcher with a challenge and less than adequate data’ (Creswell, 2003, p. 133). The researcher’s experience of the interview process was a positive one and she felt that both she and her interviewees spoke openly and honestly at all times. Even though the interviewee’s anonymity is waived in an interview situation, the researcher endeavoured to protect their identities when reporting data (Gall et al., 1996).

5.5.3.4 DESIGN

The interview schedules were prepared in advance and guided the interviewer during the interviewing process. Each one listed the content questions, the probe questions, and opening and closing statements (Dörnyei, 2007; Gall et al., 1996). The researcher kept questions short and simple to avoid leading and double-barrelled questions, and to avoid the use of loaded and ambiguous words (Dörnyei, 2010; Gall et al., 1996; Wellington, 2000). Content questions mostly concerned the interviewee’s knowledge, experiences, opinions and values in terms of the Irish language, instructional approaches and technology integration in the Irish-language classroom.

5.5.3.5 APPROACH

An assurance of confidentiality was provided prior to initiating the interview (Wellington, 2000; Gall et al., 1996) encouraging the interviewee to respond ‘openly and in detail’ (Dörnyei, 2007, p. 140). All interviews were audio recorded and permission was sought beforehand. Wellington (2000) notes that recording an interview preserves the verbatim account and permits the interviewer to maintain eye contact and observe body language. The researcher used two audio recorders during her interviews in case one device failed and she backed up her recordings to an online cloud storage account immediately afterwards. She transcribed each

recording within a week of conducting the interview and included metadata such as time, date, setting, duration and participant details. The average interview lasted approximately 25 minutes. Member checking was completed once interviews were transcribed and revisions were applied where necessary.

5.5.4 STUDENT FEEDBACK SESSIONS

Two semi-structured focus group interview schedules were designed as part of the original research protocol. Each of the focus group interviews were to be convened with three groups of students from the intact class. The researcher planned to audio record and supplement her recordings with photographs. She intended to conduct the first set of focus groups prior to the classroom intervention in order to elicit student opinions and experiences of Irish-language learning, and the second set after the intervention in the form of a programme evaluation. The researcher had also anticipated that students would each keep a reflective journal during the academic year. She initially intended to leave the choice of language open to the students and to progress to Irish as the year advanced.

The class teacher felt that parents would neither give their permission nor appreciate their children being delayed after school. The teacher also advised that finding a room in which to host focus group interviews during the school day would also be challenging as space was limited. In addition, the teacher felt that students writing reflective comments in their journals would add to their homework-time and also that it would prove difficult to implement as students only embarked upon formal writing in Irish in third class. Langemeyer & Nissen (2005) reveal how ‘research methods develop as part of the social practices studied’ (p. 189) and in this instance the researcher had to adapt her research methods to her situation. She therefore conducted whole-class student feedback sessions in the classroom in place of focus groups, gleaning information regarding students’ opinions, views and experiences of Irish-language learning, technologies and collaborative learning. Each feedback session was video recorded as students were asked to give their opinions orally. Students also returned feedback in written format, writing short comments in English or in Irish. This customised data-collecting instrument combined the focus group and reflective journal instruments, albeit on a much simpler platform, but yielded rich data. All questions posed during the student feedback sessions can be found in the discussion guide in Appendix [B].

The researcher feels that several aspects of the rationale, strengths and weaknesses pertaining to the focus group interview and reflective journal methods can be applied to her adapted data collection method of student feedback sessions and describes them in the following section.

5.5.4.1 RATIONALE

As aforesaid, student feedback sessions are a customisation and amalgamation of the focus group interview method and the reflective journal method. During a focus group interview, the researcher can encourage participants to interact and motivate one another to express ‘feelings, perception, and beliefs that they would not express if interviewed individually’ (Gall et al., 1996, p. 308). A reflective journal allows students to document and reflect upon their ‘experiences in a particular setting or situation’ (Robson, 2011, p. 270). Student feedback sessions took place in the familiar environment of their classroom. Students felt comfortable and at ease, and as a result, their responses (both verbal and written) were honest and forthcoming, with discussions becoming quite lively at times. The researcher wished to gather their opinions and thoughts in relation to innovative learning activities.

5.5.4.2 STRENGTHS

The researcher believes that student feedback sessions were an efficient way to collect data, and a means for clarifying and exploring events that had occurred in the classroom. Just like focus groups, student feedback sessions can be used to gather a large amount of qualitative data in one sitting, saving time and effort (Dörnyei, 2007) and can help the researcher to ‘investigate phenomenon that are not directly observable’ (Mackey & Gass, 2010, p. 173). In addition, young children, may feel ‘safer, more secure and at ease if they are with their peers’ (Wellington, 2000, p. 81).

5.5.4.3 WEAKNESSES

Social desirability bias is common in focus groups as participants are more reluctant to share less socially acceptable information. The halo effect can also affect focus group interviews. The researcher did not experience this with student feedback sessions as students spoke candidly and, at times, prefaced their opinions with statements and questions such as ‘no offence to you’ or ‘can we say that we didn’t like something?’. The moderator is expected to be a competent multitasker, time

manager and communicator, and must be able to manage ‘dominant individuals who may monopolize the interview [and] the person who is afraid to speak in a group’ (Wellington, 2000, p. 81). The teacher and researcher moderated these sessions together and were well accustomed to the many personalities in the room, the teacher in particular. Transcribing an interview of this type can be difficult due to multiple voices but video recording aided this process as it made it easier to identify speakers.

5.5.4.4 DESIGN

The whole class format, which is similar to the focus group format, enables participants to contemplate, inspire, challenge and react to one another. This within-group interaction can yield high-quality data as it can create a synergistic environment that often results in a deep and insightful discussion (Dörnyei, 2007). Gall et al. (1996) believe that it works best when ‘all members are on an equal basis’, otherwise participants ‘may feel inhibited about sharing their actual perceptions of the phenomena being investigated’ (308). The classroom of students was homogeneous in terms of age and language learning abilities (Dörnyei, 2007). The agenda was very much left open, however, to enable the moderators to pursue a particular line of inquiry when they felt it was important to do so (Barbour & Schostak, 2005).

5.5.4.5 APPROACH

A focus group interview typically lasts one to two hours (Dörnyei, 2007). The student feedback sessions were considerably shorter and composed of short dynamic bursts of interaction over a fifteen-minute period. The researcher and teacher facilitated the discussions in order to keep them on topic (Mackey & Gass, 2010) and actively supported members to think critically (Dörnyei, 2007). Students participated in eight group feedback sessions over the course of the classroom intervention. They were video-recorded and transcribed. This approach suited the students in terms of duration and setting. The researcher and teacher reiterated each time that there were no right or wrong answers, only personal views and experiences as the following dialogue illustrates (Feedback Session Two):

Rose: Is it nice to hear your own voice back in Irish?

Conall: Do you care if we say No or Yes?

Rose: Oh, whatever you want. I want to know what you think!

The researcher found that students digressed very little, quite possibly due to the short duration of these sessions. Students wrote their feedback on coloured post-it notes in the classroom or answered multiple-choice questions electronically using Socrative in the computer room.

5.5.5 IRISH LANGUAGE TESTS

A language test can be used to assess a student's progress over time (Dörnyei, 2007). The researcher and teacher conducted two standardised Irish-language tests during the instructional intervention. These were paper-and-pencil tests where each student answered a set of standard questions and their responses are graded exactly the same way (Schreiber & Asner-Self, 2011). Results indicated how well students performed in comparison to a representative sample of the population (*ibid*).

5.5.5.1 RATIONALE

These tests were used as an indicator of participant student achievements in Irish-language learning compared to that of third-class students nationwide. In addition, the researcher implemented these two tests four months apart in a bid to measure language progress over time. Tests such as these are indicative of experimental research, where one variable is implemented while keeping all others constant. As Papert (1993a) states this 'may be an appropriate way to evaluate the effects of a small modification. However, it can tell us nothing about ideas that might lead to deep change' (p. 26). As a result, the researcher did not place too much weight on student results, especially when they rarely provide 'hard evidence of intervention effects' (McKenney & Reeves, 2012, p. 148). While standardised tests assess relatively superficial, decontextualised and compartmentalised knowledge (Sawyer, 2008; Walker, 2006), they can provide an indication and confirmation of learning when used in combination with other assessment techniques such as observations and learning tasks with scoring rubrics (NCCA, 2007; Walker, 2006).

5.5.5.2 STRENGTHS

Standardised tests involve standardised procedures for administration, scoring and interpretation of results (NCCA, 2007). They are empirically supported and verified by other studies conducted with representative samples in terms of age and grade level (ibid). Test scores are quantitative in nature and therefore objective and are easy to compute and analyse (Dörnyei, 2007).

5.5.5.3 WEAKNESSES

There is always a margin of error associated with a test score in that the ‘result may be in error to a certain degree above or below the child’s test score’ (INTO, 2011, p. 35). In addition, a test may measure a student’s performance on a particular day, but it is not a certain measure of her ability (NCCA, 2007). Schreiber & Asner-Self (2011) refer to this as a believability problem as test scores are often interpreted ‘past what they actually measure’ (p. 139). Peripheral factors such as feelings of unwellness or nervousness can affect the student’s performance on a test (INTO, 2011). Another weakness to consider is that these tests assess a narrow range of skills (Nic Craith, 2010) and cannot measure elements such as student progress in oral language or creative writing abilities (DES, 2011). According to Blumenfeld et al. (1991), standardised tests focus primarily on low-level comprehension and are inappropriate for assessing the benefits of collaborative learning, for example.

5.5.5.4 IMPLEMENTATION

All primary schools are required to administer standardised tests in English and Mathematics to their students in second and sixth classes (NCCA, 2007; Nic Craith, 2010). Such tests are available for Irish too but the uptake is extremely low compared to English tests (INTO, 2011). The Irish Educational Research Centre (ERC) provides a set of standardised tests for Irish aimed at third and fourth-class students in English-medium schools. The pack of tests is called *Triail Ghaeilge Dhroim Conrach do Scoileanna Rialta (TGD-R)*, colloquially known as the Drumcondra tests. The content is based on the current primary school curriculum for Irish and it was standardised on a nationally representative sample of almost 10,000 pupils in English-medium schools in May 2010 (Educational Research Centre, 2016).

Two standardised Irish-language tests were administered to the students of the intact classroom to assess their reading and listening skills yielding scale scores, percentile ranks and sten scores for the overall test and for each of the reading (Léamh) and listening (Éisteacht) categories. The reading category was further subdivided into the following elements: Reading Vocabulary (Léamh-Foclóir) and Reading Comprehension (Léamh-Tuiscint). The test took 115 minutes to complete, including delivery of instructions (ibid).

The standardised tests came in packs of two parallel tests, Form A and Form B. Parallel forms are used to reduce the opportunity for copying and to enable repeated administrations. The teacher administered the first test in class in early January 2015. Students received either Form A or Form B. She later administered the second test in class in late May 2015. Students who completed Form A in January received Form B in May, and vice versa. The teacher corrected all the tests and entered the scores into an Excel spreadsheet.

5.6 VALIDITY AND RELIABILITY PROCEDURES

The researcher situated her study within a considered and transparent conceptual framework, thereby warranting her choice of methods and enhancing data validity and reliability. Data validity is a measure of truthfulness and ‘concerns the whole research process’ (Dörnyei, 2007, p. 50). Reliability refers to the idea of replicability of data across several studies (Golafshani, 2003). Her conjecture map in chapter 6 also guided her in her selection of research methods to measure student learning outcomes (Sandoval, 2014, p. 33).

It is important to note, however, that there is a tension in educational research between being scientifically trustworthy and usable in a practical sense (McKenney and Mor, 2015; Sandoval & Bell, 2004). Many DBR studies rely on personal narrative accounts to communicate and justify findings (Knowlton, 2007). Shavelson et al. (2003) question the scientific status of such conclusions, however, as narratives that lack controls on ‘extraneous variables will not be able to warrant the causal claim’ (p. 27). As Reeves (2011) observes, learning is complex and it is, therefore, difficult to ‘identify the contribution of any one kind of activity, experience, or interaction’ (p. 13). It is impossible to control the many variables inherent in

classroom learning, especially as the intervention evolves across iterations (Hernández-Ramos & De La Paz, 2009; Reeves, 2011).

The researcher maintained systematic documentation of qualitative data derived from observations, field notes, interviews and student feedback sessions in order to enhance rigour, credibility and replicability. Researcher bias is also inevitable in a DBR study due to the researcher's subjective involvement (Hall et al., 2016; Kelly, 2004). According to Schreiber & Asner-Self (2011), however, 'there is no such thing as a valid or reliable test/instrument' as all instruments are influenced by researcher bias in some way (p. 106). Hoadley (2005) believes that such 'intimate knowledge', however, helps researchers to 'draw educated guesses' about events unfolding in their classrooms (p. 45).

5.6.1 DATA VALIDITY

Data validity ensures that each research instrument measures what it has been designed to measure (Dörnyei, 2003; Hoadley, 2004) so that inferences can be made from the data collected (Schreiber & Asner-Self, 2011). The researcher has discussed validity under each of her research methods outlined above and triangulated methods to bolster weaknesses inherent in some instruments by 'offsetting them by the strength of another' (Dörnyei, 2007, p. 43) and to catch 'insights and understanding that might be missed when only a single method is used' (Johnson & Onwuegbuzie, 2004, p. 21). Triangulating the national teacher questionnaire with the classroom intervention informed the design of innovative activities and its data informed the teacher interview study in terms of sampling decisions and schedule design (Dörnyei, 2007; Greene et al., 2005; Mayer, 2005). Furthermore, triangulation of participant observation, teacher interviews and student feedback sessions ensured data were representative and non-biased (Robson, 2011). The latter two served as a way of checking and verifying particular data arising from participant observation sessions and provided a platform to further explore data. Triangulating student language tests and student questionnaires with participant observations also enhanced validity.

5.6.1.1 INTERNAL VALIDITY

A distinction is made between internal and external validity. Internal validity addresses the ‘soundness of the research’ (Dörnyei, 2007, p. 50). External validity refers to how we can generalise our results to the wider population, ‘beyond the observed sample’ (ibid). Possible threats to internal validity include participant mortality, where participants withdraw from a study (Dörnyei, 2007; Mackey & Gass, 2010). Not every student was present each day and one student moved schools during the intervention, while another joined around the same time. The researcher decided to include all data pertaining to all students as the researcher was not interested in individual student cases per se. Another threat to internal validity is participant inattention. The researcher believes that participants answered openly and truthfully at all times. Students endeavoured to please the researcher at the early stages of data collection (the halo effect), but this diminished with time as they became more comfortable with her. In terms of questionnaires and group feedback sessions, students were always reminded that there were no right or wrong answers, and that it was their own opinions that mattered.

Content validity is another threat to internal validity and was accounted for during the pilot phase when expert judgement about content was obtained (Dörnyei, 2007). Research designs emphasising ‘prolonged engagement and persistent observation’, characteristics of this particular study, carry more face validity (Dörnyei, 2007, p. 61). The researcher was present for nine months and observed 60 hours of classroom activity. She provided a thick description of events and ensured her descriptions were true to the activities observed. Moreover, the researcher and teacher worked closely with the curriculum and textbook, resulting in learning activities that were familiar to students, therefore enhancing face validity.

5.6.1.2 EXTERNAL VALIDITY

Sampling poses a threat to external validity in terms of how well the sample represents the population in question. Students were selected using a convenience sampling strategy and therefore do not form a representative sample of the population (Barbour & Schostak, 2005; Dörnyei, 2007; Mackey & Gass, 2010). This type of sampling procedure, however, is very common in second language research and is often conducted out of necessity when intact classes and their teachers participate in educational research (Mackey & Gass, 2010). Mackey & Gass (2010)

also believe that the use of intact classes, especially when investigating instructional methods in its natural setting, can potentially enhance face validity where students are comfortable and familiar with the role of instruction in the classroom and perceive a connection between the research activity and the pedagogical activity.

To ensure sample representativeness in a convenience sampling procedure, Mackey & Gass (2010) suggest meticulously describing the selected sample and setting of the study so that readers can ascertain 'to whom and in what circumstances the results may be meaningful' (p. 124). Schreiber & Asner-Self (2011) state that the 'greater the degree of detail and procedural clarity, the more one will be likely to trust the data collected and the inferences drawn from that data' (p. 117). The researcher describes the student and teacher participants and classroom setting in detail in the next chapter, Intervention Overview. Chapters 7 through 9 depict the classroom intervention in terms of each of the three design cycles. Even though teacher respondents were selected for interview using a purposive sampling technique, these interviewees were selected from a sample of 668 questionnaire respondents, thus increasing the representativeness of the population at large (Dörnyei, 2007).

5.6.2 RELIABILITY

This is predominantly a qualitative study and replication of findings will therefore be difficult to realise due to the 'researcher's subjective interpretation' of personal accounts (Dörnyei, 2007, p. 57). Replicability is difficult to achieve in educational research in general, however. Biesta & Burbules (2003) believe that 'educational problems are always unique and for that reason always require unique responses, tailored as best as possible to the idiosyncrasies of the actual, unique situation. This, and nothing else, is what we should expect from educational inquiry' (p. 81). The researcher is aware that the replication of her classroom intervention may be challenging as it is 'difficult to control for learners' prior experiences' (Hoadley, 2004, p. 203), but describing the innovation in detail, in addition to her 'multiple observations, conducted over time' (Jesse, 2001, p. 2), can enhance rigour and reliability. Reliability of findings in a DBR study, in particular, is supported through 'triangulation from multiple data sources, repetition of analyses across cycles of enactment, and use (or creation) of standardized measures or instruments' (The Design-Based Research Collective, 2003, p. 7). The researcher believes she has

provided ‘enough information’ to convey that the process of this research study is ‘logical, traceable, and documentable to the reader’ (Jick, 1979, p. 603), enabling others to examine the evidence and replicate if they so desire.

5.7 ETHICAL ISSUES

The researcher adhered to the following three principles whilst conducting her empirical study – principles promoted by the 1947 Nuremberg Code, the 1964 World Medical Association’s Declaration of Helsinki (revised in 2004) and the 1979 Belmont Report:

1. Respect for autonomy (a person’s freedom and choice);
2. Non-maleficence (do no harm) and beneficence (do good); and
3. Justice (fairly distributed burdens and benefits).

Arising from these principles, three core ethical concepts (Creswell, 2003; DCYA, 2012) shaped this research study prompting the researcher to:

- Seek informed consent and assent;
- Ensure confidentiality and anonymity; and
- Minimise risk of harm.

Derry et al. (2007) succinctly capture these core ethical values when they state that research participants should be ‘fully informed about the purposes, risks and potential reward of the research; that given this information they participate voluntarily; that they be allowed to comfortably withdraw their participation during a study without penalty; and that the participant’s expectations and rights to privacy and confidentiality will be honoured’ (p. 59). The researcher designed her study around these ethical values and received approval from the university’s Research Ethics Committee prior to conducting her fieldwork. The following sections describe her approach in observing informed consent and participant confidentiality, along with articulating any risks and benefits to participants.

5.7.1 INFORMED CONSENT

In educational research, one of the major concerns regarding ethical issues is informed consent. According to the Belmont Report (National Commission, 1979), informed consent requires that participants be provided with the opportunity to

choose what shall or shall not happen to them. BERA (2004) understands voluntary informed consent ‘to be the condition in which participants understand and agree to their participation without any duress, prior to the research getting underway’ (p. 6). The consent process involves three elements: information, comprehension and voluntarism (Cohen et al., 2011). All parties were informed of the purpose of the research study, of what participation entailed, and of their right to withdraw at any time, including assurance of confidentiality (BERA, 2004; Cohen et al., 2011; Creswell, 2003; DCYA, 2012; Mackey & Gass, 2010). All documentation, see Appendix [A], was presented in simple language and in an age-appropriate and language-appropriate way (Wiles et al., 2005). The researcher attended to layout, colour, font, language register and graphics of consent forms and avoided information sheets that looked too official (ibid). The students’ documentation contained limited text and mostly composed of meaningful icons and graphics.

Permission to gain access to the classroom was granted by the gatekeeper (principal) and signed consent was obtained from the teacher, the principal, and parents and guardians of the students. Informed assent was obtained from the students since they were under 18 years of age (DCYA, 2012) and were therefore classed as a vulnerable group or ‘persons with diminished autonomy’ (National Commission, 1979, p. 4). When a competent adult voluntarily agrees to participate in research, their decision is binding. This is not so for children as ‘such a decision by a minor is considered to constitute assent’ (Felzmann et al., 2010, p. 59) and needs to be accompanied by the child’s parent or guardian’s consent. This opt-in consent is considered ethically more appropriate (ibid) and was the approach undertaken in this study.

5.7.2 CONFIDENTIALITY

Felzmann et al. (2010) believe that it is the responsibility of the researcher to protect participant information and to ensure that data do not become available to unauthorised persons. This research study adhered to the guidelines depicted in the Data Protection Acts 1988 and 2003 (The Office of the Data Protection Commissioner, 2003). The researcher kept data safe and secure in password-protected files on a password-protected computer in her office on university campus grounds. The researcher ensured that data were accurate, complete and up-to-date (ibid). Random pseudonyms were employed in lieu of real names to protect the identity of participants. A master list of corresponding names, for cross-referencing,

was kept in a second secure location (Gibbs, 2007). As per the recommendation of the National University of Ireland, Galway's Research Ethics Committee, all data will be securely retained for a minimum period of five years after completion. Following that time, all digital and printed data will be erased.

5.7.3 RISKS AND BENEFITS

The researcher treated each participant with the utmost of respect at all times and emphasised the importance of his or her contribution to her study. Teacher participants were invited to validate their interview transcripts and make any amendments they deemed appropriate. The Department of Children and Youth Affairs (DCYA, 2012) advocates the implementation of several child protection and well-being factors during the research process. In accordance with these recommendations, the researcher received Garda-vetting approval prior to entering the classroom. The teacher was present at all times and students were always comfortable and content as they engaged with learning activities. The researcher is also aware that schoolchildren are an over-researched group (DCYA, 2012). She believes, however, that her study has resulted in a positive outcome for students and teachers in terms of enhanced learning and attitude towards the Irish language.

5.8 PILOTING OF RESEARCH INSTRUMENTATION

The researcher pilot-tested the interview and questionnaire instruments with an alternative sample of three Irish-medium primary school teachers prior to commencing the main study, thus ensuring content validity. These three teachers were 'similar to the target population the instrument was designed for' (Dörnyei, 2007, p. 112). She tested the pilot participants' comprehension of the interview questions and questionnaire items, and revised questions and instructions upon their recommendations (Wellington, 2000). She also trialled the hardware and software required to audio-record, transcribe, store and analyse interview data, along with the software and hardware selected for hosting, administering and analysing the questionnaire data (Gall et al., 1996; Pritchard & Whiting, 2012). The student questionnaires, the parental questionnaire and the fourth-class teacher questionnaire were also reviewed by the classroom teacher ensuring that content was appropriate and all instructions were clear and unambiguous (Mackey & Gass, 2010).

In terms of participant observation, the researcher learned in situ. She felt that negotiating entry to a classroom in another school in terms of ethical approval and access was not an option as finding a school to participate in her main study had been challenging in itself. In her first six weeks, she designed an approach that would capture data pertinent to her research questions. During this time, the researcher realised that it was more beneficial to record groups of students at the teacher's desk as her computer was connected to the interactive whiteboard. This not only enabled her to record student and computer screen activity, but it encouraged the students, teacher and researcher to work between the whiteboard and the laptop. This also seemed to inspire and encourage students in other groups as they looked on while creating their own stories. She also realised that the external microphone connected to the camera was not picking up the audio clearly and incorporated a second recording device.

5.8.1 INSTRUMENT DESIGN REVISIONS

In the first cycle of her intervention, the researcher had intended to remain detached from teaching and learning activities and observe them as they unfolded, undertaking a non-participatory role. She designed an observation schedule in advance and attempted to incorporate this into her study. She was drawn into classroom activities by the teacher, however, interrupting normal lesson flow and activity. The teacher often asked for translations or queried language constructs and correct pronunciation. This resulted in her noting observations in a more unstructured way. Robson (2011) believes, however, that it is 'possible to have nonparticipant observation which is unstructured' (p. 329). The researcher felt her presence had become reactive, 'potentially changing the thing observed' (Robson, 2011, p. 331). It also came to light, at a later stage, that the teacher's lessons had changed when a student had compared classes before the intervention began and early in the first design cycle as being more interactive, leading the researcher to believe that her presence had an effect on the teacher and that social desirability bias had occurred:

You know the way at the start of the year we did boring Irish, and then we did games when you [researcher] came first, and then we did computers. Do we have to go back to boring Irish again when you [researcher] go? (J, April 2015).

In terms of the national teacher questionnaire, it was brought to the researcher’s attention that the Likert scales incorporated into question items seemed confusing. She employed the following scale in many of her questionnaire items: Strongly Agree, Agree, Neither Agree nor Disagree, Disagree, Strongly Disagree. The researcher had varied the order of rating scale options for each question item in order to avoid respondent complacency as per the advice of Dörnyei (2007) stating: ‘items from different scales need to be mixed up as much as possible to create a sense of variety and to prevent respondents from simply repeating previous answers’ (p. 111). However, pilot participants noted that this could be viewed as misleading and cause participants to select the incorrect scale option. The researcher heeded their feedback and decided to maintain the same order throughout the questionnaire.

In addition, one pilot participant noticed that the researcher had omitted to include tablet devices in question items seven to ten of the national teacher questionnaire, when requesting information about quantity and access to computers in school. This was subsequently incorporated into the question. The researcher also integrated feedback in relation to question three: Have you had any previous computer training? She included a seventh checkbox titled ‘Self-Taught’ along with the original set of options: In-service Training, Certificate, Diploma, Degree, Postgraduate Diploma and Masters’ Degree. The diagram below depicts the large number of teachers, 432 in total, who selected this additional option.

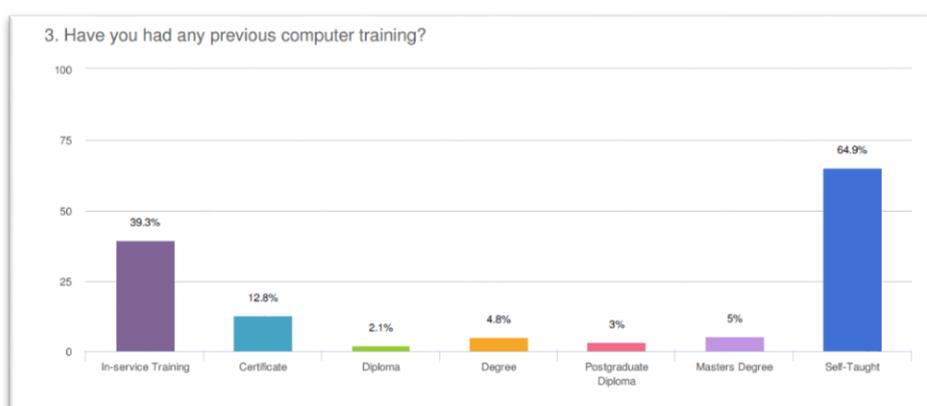


Figure 5.4: Pilot Revision

Pritchard & Whiting (2012) state that the aim of a pilot is ‘not to achieve a “perfect” research design but rather to determine a workable way forward for the rest of the research project’ (p. 349) . This is how the researcher approached piloting, where research instruments for the main study were revised to reflect valuable input received from pilot participants.

5.9 DATA ANALYSIS

This section outlines the approach the researcher undertook in analysing her data corpus. As this is a design-based research study, data collection and analysis procedures merged very early on in the research process (Jewitt, 2012). Both quantitative and qualitative datasets were analysed over three iterations, where successive iterations drew on the analysis of preceding iterations (Robson, 2011). Qualitative data from interviews, participant observations, field notes and student feedback sessions were thematically analysed. Conversation analysis was the approach employed to explore the language used in natural exchanges between students and between students and teachers. Quantitative data gathered from questionnaires and language tests were summarised using descriptive statistics methods. The researcher discusses her approaches to analysis in the following sections.

5.9.1 THEMATIC ANALYSIS

Thematic analysis involves the identification of codes, where particular data segments are extracted and organised into meaningful groups (Robson, 2011). These codes represent a point of interest to the researcher and are ‘potentially relevant to the research question’ (Braun & Clarke, 2012, p. 61). In this section, the researcher discusses the rationale, strengths and weaknesses of thematic analysis, along with her approach to analysing qualitative data.

5.9.1.1 RATIONALE

Thematic analysis is a generic approach to analysis and is not connected to any particular theoretical perspective (Robson, 2011). In fact, it can be employed within most theoretical frameworks once assumptions in relation to epistemology and ontology have been declared (Braun & Clarke, 2016). The researcher employed it

within a pragmatic framework to reflect the reality of Irish-language learning and teaching in the classroom.

5.9.1.2 STRENGTHS

Thematic analysis is a method of analysis for ‘systematically identifying, organizing, and offering insight into patterns of meaning (themes) across a data set’ (Braun & Clarke, 2012, p. 57). It is also known for its flexibility and ease of use with all types of qualitative data (Robson, 2011; Braun & Clarke, 2006).

5.9.1.3 WEAKNESSES

Robson (2011) notes how thematic analysis is ‘frequently limited to description or exploration with little attempt made at interpretation’ and that studies sometimes fail to discuss details of the procedure itself (p. 477). In this study, the researcher has endeavoured to describe her approach to thematic analysis and to show an account of how she arrived at her interpretations.

5.9.1.4 APPROACH

In this study, qualitative data were analysed inductively and deductively as analysis was both data and theory-driven. Braun & Clarke (2006) describe deductive thematic analysis as approaching the data with specific questions in mind, ones that ‘you wish to code around’ (p. 94). As part of this deductive process, the researcher conceptualised and compiled codes and themes into a codebook according to her research questions and specific theoretical constructs prior to engaging with the data analytically (Derry et al., 2010; Gibbs, 2007). Examples of such theoretical themes include scaffolding around language, scaffolding around technology, engagement with learning and peer learning. Inductive thematic analysis means that the codes and themes are derived ‘from the content of the data themselves’ (Braun & Clarke, 2012, p. 58). The researcher analysed the data content in this way by reading through the textual data in her transcriptions and playing back her audio and video recordings in order to identify codes emerging from her data (Goldman et al., 2007; Guest et al., 2012). Examples of emerging themes include translation as an instructional approach, students self-correcting, students and their spellings, and instruction bursts.

Data were also analysed thematically at the ‘latent level’, where the researcher went beyond the semantic content of the data and examined ‘underlying ideas, assumptions, and conceptualisations...that [were] theorised as shaping or informing the semantic content of the data’ (Braun & Clarke, 2006, p. 89). The researcher’s commitment to an interpretative constructionist epistemology lays down the foundation for latent thematic analysis of data, especially as she sought to theorise the socio-cultural context of the classroom (Braun & Clarke, 2006), in which students collaboratively constructed knowledge through engaging in technology-enhanced language learning activities.

Braun and Clarke (2006) designed a six-step guide to conducting thematic analysis. This involves (1) immersion, (2) first pass of coding, (3) second pass of coding, (4) identification of themes, (5) finalisation of themes, and (6) writing the story. This is not a linear process, however, where you move from one phase to the next, instead it is a more ‘recursive process, where you move back and forth as needed, throughout the phases’ (Braun & Clarke, 2006, p. 92). The researcher followed this approach and discusses its various phases in the following sections.

5.9.1.4.1 IMMERSION

The researcher repeatedly read, listened and viewed her data in order to become familiar ‘with the depth and breadth of the content’ (Braun & Clarke, 2006, p. 92). In terms of video and audio, Barron & Engle (2007) propose a play-by-play approach to analysis where ‘interpretations of episodes that follow each other in time are presented sequentially’ to show how a construct has ‘transformed over time’ (p. 29). She played the recordings at normal speed and in slow motion during multiple passes across her data, helping to clarify participant meanings whenever they seemed vague or uncertain. Slowing down or speeding up viewings in this way provided ‘analytic and interpretative distance and reflexivity’ and, together with repeated viewings, the video event seemed ‘more like an artifact and less like a moment of life’ (Lemke, 2007, p. 46). The transcription process also aided this immersion process, especially as she undertook a detailed approach to transcribing verbal and non-verbal data, ensuring that information remained ‘true to its original nature’ (Braun & Clarke, 2006, p. 93).

5.9.1.4.2 FIRST AND SECOND PASSES OF CODING

The researcher used NVivo²³ to store and analyse her data. This is a computer assisted qualitative data analysis software (CAQDAS) application that houses and codes many types of media files for deeper analysis. She generated a list of codes and their descriptions based on her research questions, theoretical framework and literature review. She then analysed her data line-by-line and placed extracts of her data pertaining to her observations, field notes, interview transcripts and student feedback into these codes (Robson, 2011). She also created new codes that had emerged from the data during her analysis. In terms of her data extracts, she included the sentences surrounding the extracts to ensure contextual information was maintained (Braun & Clarke, 2006). When all data were coded, the researcher embarked on the third stage of thematic analysis, undertaking a second pass at coding and revisiting each code and its contents, combining and deleting codes where necessary. The researcher produced 149 codes in total.

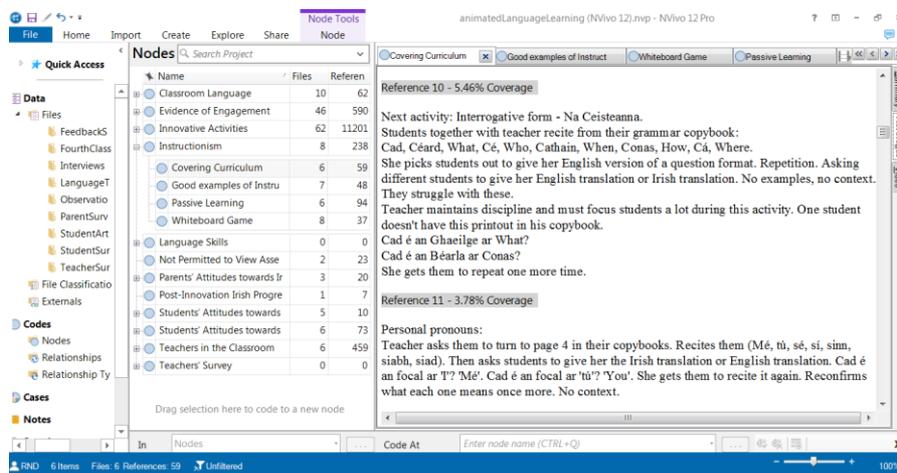


Figure 5.5: Codes in NVivo

²³ <https://www.qsrinternational.com/nvivo/home>

NVivo made it possible to view coded data alongside its associated timecoded audio and video segments, as illustrated below.

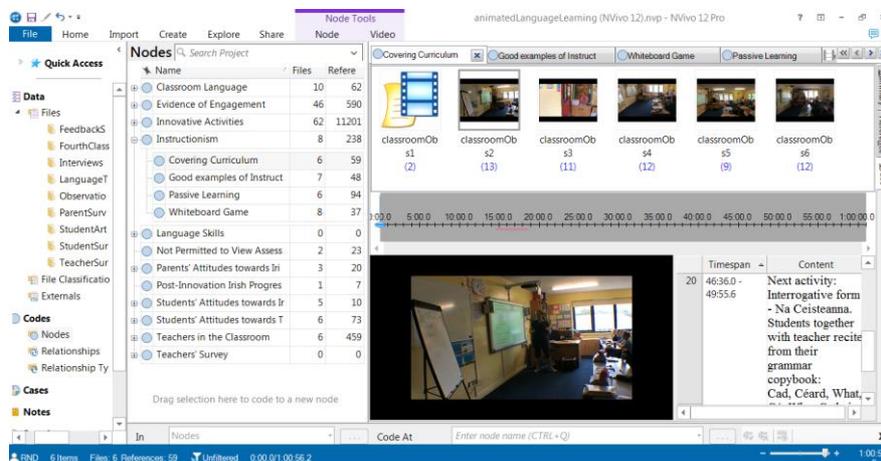


Figure 5.6: Codes in NVivo Displaying Corresponding Video

5.9.1.4.3 POTENTIAL THEMES

In stage four, extracts of data pertaining to each code were reviewed, sorted and collated into four themes and 14 subthemes. A theme captures ‘something important about the data in relation to the research question, and represents some level of patterned response or meaning within the data set’ (Braun & Clarke, 2006, p. 86). The four main themes include language learning (105 codes), technology learning (44 codes), active learning (35 codes) and engagement (10 codes). The fourteen subthemes include:

1. Traditional learning (3 codes)
2. Translation/immersion (5 codes)
3. Attitude (17 codes)
4. Autonomous learning (9 codes)
5. Students and their spellings (8 codes)
6. Comprehension and speaking (24 codes)
7. Student presentations (8 codes)
8. Peer corrections (3 codes)
9. Technology learning gains (15 codes)
10. Reconstruction (4 codes)
11. Collaboration (14 codes)
12. Scaffolding (32 codes)
13. Peer learning (29 codes)
14. Instruction bursts (13 codes)

5.9.1.4.4 FINAL THEMES

The researcher defined and described each individual theme in relation to the research questions in stage five. The mind map below represents the final themes, sub-themes and the interconnections between them.

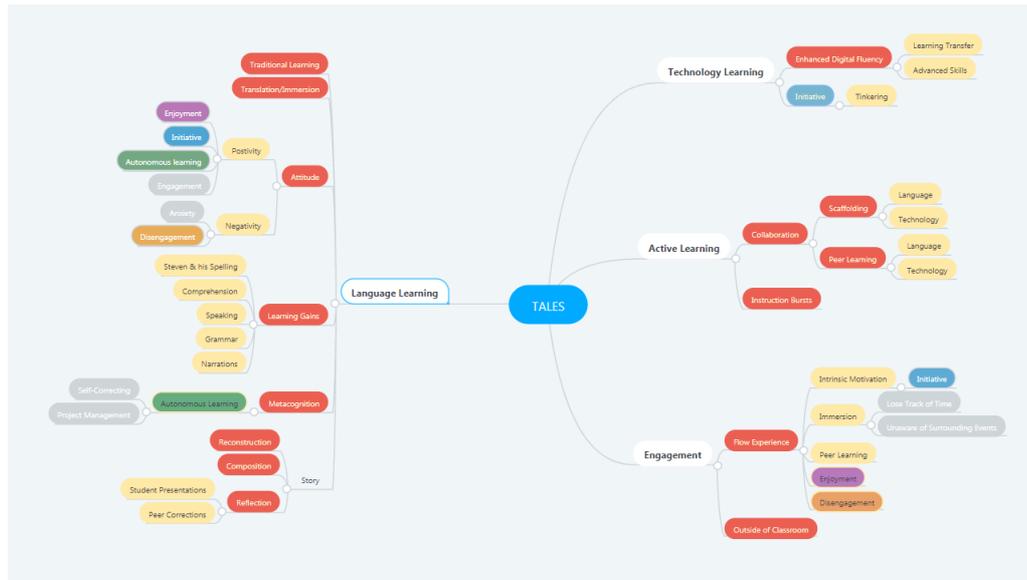


Figure 5.7: Mind Map of Themes

5.9.1.4.5 STORY

The final stage reveals the story of these data ‘in a way which convinces the reader of the merit and validity’ of the analysis (Braun & Clarke, 2006, p. 99). Chapters 7 through 10 describe the iterative process of data collection and analysis, and the findings that emerged from this research study.

5.9.2 CONVERSATION ANALYSIS

Conversation analysis is rooted in the ethnomethodological tradition, which ‘is the study of the ways in which people produce recognizable social orders and processes’ (Guest et al., 2012, p. 14). Ethnomethodology’s concern with ‘sense making makes it a natural framework for undertaking a study of instructional practice’ (Koschmann

et al., 2007, p. 134). Conversation analysis is a subset of discourse analysis and is concerned with the analysis of talk-in interaction occurring in small groups, specifically semantic, syntactic and pragmatic details in utterances (Stahl, 2012). It is limited to ‘natural conversations between two or more people’, while discourse analysis is broader in terms of scope as it extends to written documents and other ‘naturally occurring text’ (Guest et al., 2012, p.15).

Traditionally, learning has been observed as a hidden change in the mental state of student knowledge and is often measured using pre-tests and post-tests in educational research (Stahl, 2012). Conversation analysis allows the researcher to observe the ‘meaning-making processes at work’ by studying the talk interaction between people and reporting the effectiveness of technological and pedagogical approaches (Stahl, 2012, p. 2). It is a linguistic-oriented approach to data analysis and requires ‘much more analytic time and effort per page of text’ compared to standard thematic analysis (ibid). It looks at ‘elements such as grammatical structures’ and focuses on ‘units of text, such as phrases and sentences’ (ibid). While transcriptions were detailed, they were not overly technical as the researcher’s focus was to analyse meaningful negotiation of the Irish language linguistically. She was mostly concerned with grammatical and syntactical points of interest as opposed to turn taking and overlapping speech.

5.9.2.1 TRANSCRIPTION PROCESS

Gibbs (2007) notes that transcription is a change of medium that can ‘introduce issues of accuracy, fidelity and interpretation’ (p. 11). The researcher is aware that there is ‘no such thing as a “complete” transcript that captures the full complexity of all verbal and non-verbal events’ (Barron & Engle, 2007, p. 28). Nonetheless, she endeavoured to transcribe recordings as faithfully as possible. She transcribed all digital video and audio recordings and, in the process, she became very familiar with the ‘context and subject matter’ (Gibbs, 2007, p. 18). She accumulated a total of 60 hours and 48 minutes in audio and video recordings (60:48:00) over the course of her study. She transcribed all her recordings verbatim, which resulted in a total word count of 271,888. Transcripts were detailed and lengthy, and participants’ words were transcribed orthographically. As per the advice of Barron & Engle (2007), ungrammatical word variants such as ‘gonna’, ‘doin’ were noted along with disfluencies such as ‘am’ and ‘like’. Unfinished words, due to interruptions for

example, were indicated with hyphens such as ‘múin-’ for ‘múinteoir’ (teacher) and ‘seom-’ for ‘seomra’ (room). Descriptions of activities were enclosed in square brackets such as [ag seasamh ag an gclár bán/standing at the whiteboard]. The researcher included this level of detail as it ‘can be revealing’ and important in data analysis, particularly in conversation analysis (Braun & Clarke, 2012, p. 60).

Barron & Engle (2007) also point out that the process of ‘turning records into data is enormously time consuming’ (p. 25). Gibbs (2007) estimates that transcribing ‘takes somewhere between 4 and 6 times as long as it takes to collect the data’ (p.10). On this basis, it would take five minutes to transcribe one minute of a recording. The researcher used NVivo to transcribe her video footage. She used an online application called Transcribe²⁴ to transcribe her audio recordings. There was crossover between some audio and video recordings during group activities, however, as both the camera and audio recorder captured the same activity. Each transcript was then checked against each audio and video recording to ensure accuracy of interpretation (Gibbs, 2007). Finally, interview transcripts were returned to interviewees for member checking and revisions implemented.

5.9.3 DESCRIPTIVE STATISTICAL ANALYSIS

Robson (2011) explains descriptive statistics as a way of ‘representing some important aspect of a set of data by a single number’ (p. 423). Statistics are used to organise, describe, summarise and interpret numerical data relating to a sample, and can be inferred to the wider population (Schreiber & Asner-Self, 2011). Statistical data collected through the national teacher questionnaire, student questionnaires and language tests were analysed descriptively using Microsoft Excel. Measures of central tendency such as the mean (average) value and mode (the most frequently occurring value) were computed for question items and language test scores (Robson, 2011). The researcher created a coding table where she assigned predefined alphanumerical values to questionnaire responses and test scores in order to analyse them more efficiently. Data analysis of three questionnaires are depicted below.

²⁴ <https://transcribe.wreally.com/app>

	A	B
1	Codes	
2	Positive	P
3	Negative	Ng
4	No Change	No
5		
6	Yes	Y
7	No	N
8		

Figure 5.8: List of Codes for Parental Questionnaire

	A	B	C	D	E	F
1	Name Change in child's attitude to Irish? Show more interest in Irish? Speak more Irish at home? Enjoy creating animations at home?					Comment
2	P 1	P	Y	Y	Y	I'm so happy to see subjects being approached in a much fresher manner. Keep up the great work.
3	P 2	P	Y	Y	Y	She has grown much more confident in the Irish language specially considering it's not our native language. Thank you for all the hard work with her.
4	P 3	P	N	N	Y	My child's approach to the Irish language has changed dramatically since the beginning of the school year. It's definitely become a lot more fun!!! Thank you for your time
5	P 4	P	Y	N	Y	He really enjoyed participating in your classes. He has been so enthusiastic about the Irish and the animations and I think your influence has made all the difference. Best of luck for the future.
6	P 5	P	Y	N	N	Thank you so much for your time with K. He has really enjoyed it and has found it a positive experience.
7	P 6	P	Y	N	Y	

Figure 5.9: Parental Questionnaire Analysis

	A	B	C
1	Codes		
2	Yes	1	
3	No	2	
4	Sometimes	3	
5	Excellent	A	
6	Good	B	
7	Poor	C	
8	English	E	
9	Irish	I	
10	French	F	
11	Germa	G	
12	Spanish	Sp	
13	On My Own	O	
14	In Pairs	P	
15	In Groups	Gr	
16	Read	R	
17	Write	W	
18	Listen	L	
19	Speak	S	
20			
21			
22			

	A	B
1	Codes	
2	Yes	1
3	No	2
4	Sometimes	3
5	A little	4
6	Kind of	5
7	Yes (on Wednesdays only)	YW
8	Excellent	A
9	Good	B
10	Poor	C
11	On My Own	O
12	In Pairs	P
13	In Groups	Gr
14	Read	R
15	Write	W
16	Listen	L
17	Speak	S
18		
19		
20		
21		
22		

Figure 5.10: List of Codes for Student Questionnaires

data (Jesse, 2001). This explicit, multi-stage and systematic approach to data collection and analysis yielded enhanced data validity and reliability (Barron & Engle, 2007). The researcher has already discussed her coding approach and transcription process in the previous section. Data organisation is described below.

5.9.4.1 DATA ORGANISATION

The researcher collected several types of data including video, audio, transcribed interviews and classroom dialogues, field notes, learning artefacts, as well as numerical and textual comments from questionnaires. In terms of video data, a video research workflow is not just a 'simple linear flow from capture to transcribing to coding to reporting' (Pea & Lemke, 2007, p. 34). Jones & Somekh (2005) point out that 'considerable work needs to be done to prepare video data for analysis', including transcription and coding (p. 140). It is important to note, however, that video records are not data but resources for developing data (Barron & Engle, 2007). A video recording is a 're-presentation' of an event and only becomes data when viewed through an analytic framework and, after multiple viewings, the 'opinions and biases of initial viewings give way to more empirically demonstrable accounts' (Goldman & McDermott, 2007, p.102). The researcher transferred her untouched video files to Windows Live Movie Maker to create a Windows Media Audio/Video file (.wmv) in order to import it into NVivo. Audio files were imported into an open source application called Audacity. She enhanced the audio quality by applying the noise removal and normalise filters before saving them as Wave Sound files (.wav) in order to import into NVivo. Field notes and transcriptions were also imported into NVivo. She scanned students' storyboards (135) and downloaded their digital and animated stories (520). She backed up all her media and student learning artefacts to her cloud storage account and to three external hard drives.

5.10 CONCLUDING REMARKS

This chapter outlines the methodological approaches and methods employed in the empirical study to collect and analyse data. The researcher discussed each method in terms of her rationale for choosing it, its strengths and weaknesses, and her approach to designing and implementing it in her study. She employed three qualitative methods in her research inquiry: participant observation, interviews and student feedback sessions. She used two qualitative instruments: questionnaires and

language tests. The analysis methods she utilised included thematic analysis, conversation analysis and descriptive statistics. She discussed her approach to managing and organising her data, and her transcription and coding workflows. She also demonstrated the steps she undertook to enhance data validity and reliability, and to ensure her research was conducted in an ethical manner.

This study is situated in the natural setting of a classroom and the researcher places great value on meaningful data generated by each individual participant within the study. DBR places the researcher as an ‘integral participant in the learning culture, helping to intentionally shape the learning environment through their participation’, moving beyond explanation to designing interventions (Barab & Kirshner, 2001, p. 11). The researcher’s role is to co-construct, interpret and report the participants’ experiences as they reveal them, and construct theories around these emerging data. The researcher recognises the risk of her own background and experience influencing her research (Mackenzie & Knipe, 2006) and endeavours to describe and interpret all events from the participant’s perspective, and not impose her own personal views within dialogues and interviews.

She is also aware that a classroom intervention is not easily generalisable as ‘artificial boundaries’ are placed around the local context of the classroom and is ‘sealed from the world outside’ (Cohen et al. 2011, p. 21). The researcher, therefore, triangulates the classroom intervention study with a national teacher questionnaire study to frame, validate, reinforce and guide the researcher in her inquiry. She feels that the depth of detail provided by the confinements of the classroom intervention study and the breadth of the far-reaching teacher questionnaire study complement one another, and together paint a more complete picture. The pragmatic nature of this research provides the researcher with the opportunity to combine the ‘macro and micro levels’ (Onwuegbuzie & Leech, 2005, p. 383) in her inquiry into Irish-language teaching and learning in primary school classrooms in Ireland. The following chapter provides an overview of the instructional intervention.

6 CHAPTER SIX: OVERVIEW OF INTERVENTION

6.1 INTRODUCTION

This chapter provides an overview of the instructional intervention. I have decided to recount this section in first person as it reflects my time in the classroom. In this chapter I set the scene in terms of the students and their language abilities; the classroom setting; the learning approach and activities deployed; grouping structures; technology tools; and assessment procedures. The previous chapter described the research approach, namely design-based research, as well as the research methods employed to gather and analyse data from this intervention and from the national teacher questionnaire. It is important to note that all students' and teachers' names in this thesis are pseudonyms and that all quotations are verbatim excerpts from video, audio and written data sources. Quotations taken from transcript materials were minimally edited to assist readability. I removed common clutches in natural speech such as 'am', 'like' and 'agus', and any word repetitions used when participants paused in reflection or articulation (Corden & Sainsbury, 2006).

6.2 CONTEXT OF INSTRUCTIONAL INTERVENTION

I believe that authentic, technology-enriched and collaborative engagement with the Irish language can instil a positive attitude within students and can promote real learning gains in the classroom. Students compose stories and enliven them using digital tools, incorporating all four language skills into their creations in a meaningful way. This intervention involved students co-creating learning artefacts in the form of digital and animated Irish stories aligned with curricular knowledge. Through a design-based learning approach, undergirded by the TPACK framework, students naturally integrated all four language skills into their stories and learned Irish in a novel, fun and meaningful way. The students, teacher and I participated in 32 two-hour classroom sessions and six one-hour computer sessions, resulting in 72 hours of contact time. I collected approximately 61 hours of video and audio footage in total.

This instructional intervention involved three iterations and culminates in the TALEs model, which can be adopted and adapted by language teachers in their classrooms. An iteration is characterised by ‘three interconnected phases of (1) analysis and exploration; (2) design and construction; and (3) evaluation and reflection’ (Long & Hall, 2015, p. 574). Each iteration informs the subsequent one by remediating any shortcomings observed in the previous one (Hoadley, 2004). Each one also reflects students in their current learning state, with each successive iteration manifesting a transfer of learning in terms of language skills and technical ability. Lobato (2003) defines transfer of learning as the ‘application of knowledge learned in one situation to another situation’ (p. 17). An example of a transfer task in this study would be the correct use of the preposition ‘sa’+ lenition (h) in iterations two and three after learning this grammatical rule in iteration one. Another example would be the student’s ability to search for, download and import media into the various technology applications employed across the intervention.

The first iteration entailed an exploratory pilot to gain an understanding of the learning context and to examine the potential of our proposed design activities to enhance the Irish-language learning experience in the classroom. We also assessed other practical considerations such as the ability to complete these activities within our allotted class time and the technological resources available to the students (Edelson, 2002). The second iteration involved scaling up to the mainstream cycle, where we developed and expanded upon these design activities (Hall et al., 2016). The third iteration culminated in the capstone cycle and helped to verify the innovation overall (Long & Hall, 2015; Hall et al., 2016), resulting in a robust instructional approach to Irish-language learning. I thoroughly and systematically documented the design process from the outset – from contextually analysing the instructional problem in the first iteration to achieving a solution in the third. This documentation then facilitated retrospective analysis at a later stage (Edelson, 2002).

The teacher was pivotal in the design, implementation and evaluation of the design activities, and as Cober et al. (2015) found in their study into participatory design with teachers developing learning materials and technologies, her contribution was invaluable. The innovative lessons were the focus of this study, and as such, were observed and analysed. I did not document traditional Irish lessons. Prior to entering the classroom, the teacher and I communicated online with one another in order to

plan and design our intervention. We posted our thoughts, ideas, questions and propositions to a shared Google document during the summer months leading up to the classroom intervention. We used DropBox to share multimedia files of interest, while I shared a collection of potential technology tools we could use in the classroom using Symbaloo – an online bookmarking application. We emailed one another on a daily basis once the classroom study was underway and debriefed after each classroom session. We also convened face-to-face every three weeks for meetings off-site.

6.3 THE DESIGN PROCESS

A set of design conjectures and requirements guided the overall design process of the instructional intervention. Design conjectures are theory-based (Sandoval, 2014) and are drawn from the theoretical framework and literature review in this study. They include promoting language-in-use, the pedagogical application of technology and social learning. The design requirements guiding this study are context-specific (McKenney & Reeves 2013) and are drawn from the challenges and potential solutions to Irish-language teaching at primary school level, outlined in chapter 3. They encompass language, curriculum and learning activities, and technology tools.

6.3.1 DESIGN CONJECTURES

In a design-based research study such as this one, the learning environment embodies theoretical conjectures or ontological innovations that can explain learning in naturalistic contexts (Sandoval, 2004; diSessa and Cobb, 2004). An empirical study of this learning environment allows such conjectures to be refined across multiple iterations, thereby validating them in the process (Sandoval, 2004). Sandoval (2014) posits the notion of conjecture mapping as a means of specifying ‘theoretically salient features of a learning environment design and mapping out how they are predicted to work together to produce desired outcomes’ (p. 19).

As aforementioned in chapter 2, Theoretical Framework, constructionist and socio-constructivist learning theories undergird the learning environment promoted in this study – a student-centred, collaborative, technology-enhanced, knowledge-construction language learning environment. The specific theoretical conjectures (Sandoval, 2014) embodied in this learning environment therefore include:

- Fostering language-in-use in an integrative, communicative and meaningful way;
- The pedagogical application of technology using constructionist tools and a design-based learning approach; and
- The collaborative learning through instructional and technological scaffolding.

DBR aims to improve 'the way a design operates in practice' (Collins et al., 2004, p. 34) by adapting and tweaking theories across iterations (Edelson, 2002; McKenney & Reeves, 2012; Ormel et al., 2012). Each theoretical conjecture becomes more refined and reified within the embodiment of the designed intervention itself (Sandoval, 2014) leading to the desired outcome of an enhanced Irish-language learning experience for the student. In addition, the intervention generates mediating processes such as observable interactions and co-constructed participant artefacts (ibid) to provide evidence of the desired outcomes being achieved. Sandoval (2014) believes that documenting such mediating processes 'in at least one of these two ways is required to connect aspects of a designed learning environment to observed outcomes of its use' (Sandoval, 2014, p. 23).

Sandoval (2014) proposes a conjecture map outlining theoretical conjectures, embodiment, mediating processes and outcomes as a technique to ensure that empirical research is conducted in a systematic way, producing 'not only sound instructional designs but trustworthy, usable theories of learning' (p. 33). This alignment between theory and practice enhances validity and rigour in research (Hoadley, 2004; Reinking & Bradley, 2008). The conjecture map pertaining to this study is depicted below.



Figure 6.1: Conjecture Map

6.3.2 DESIGN REQUIREMENTS

The design requirements for this study are as follows:

- Language requirement – students use the language they need as they compose their stories and recreate them in technical format by drawing on prior learning and exploring new language.
- Pedagogical requirement – students learn collaboratively in the classroom, clarifying and deepening their understanding of the language. The intervention must support active social learning in this way and promote discussion about the target language through the medium of the target language. Activities must align with curriculum.
- Technological requirement – applications must be attractive to the student, easy to learn, accessible, reliable, amenable and inexpensive.

6.4 THE TALES MODEL

TALES (Technology, Activity, Language, Engagement, Story) is a defined multi-ontological framework emerging from my:

- Biographical motivation for undertaking this research in chapter 1;
- Theoretical and conceptual frameworks underpinning my research approach in chapters 2 and 5;
- Review of the literature surrounding the subject area (chapters 3 and 4) (Hall et al., 2016, p.6).

The TALES model ‘both informed and was informed by the three iterative, sequential cycles of design-based research’ (Long & Hall, 2015, p. 587). I believe that the TALES model can enhance both students’ experience of Irish-language learning and their attitude towards it. It features a student-centred, technology-enhanced, design-based, constructionist and collaborative approach to language learning. It encompasses five design principles arising from my theoretical framework, comprehensive literature review and empirical research. Design principles are ‘heuristic statements in the meaning of experience-based suggestions for addressing problems’ (Plomp, 2007, p. 22). Each iteration evolves the concept of TALES to create more effective and educational Irish-language learning experiences for students and results in a repurposable design model (Hall et al., 2016). TALES can be adopted and adapted by Irish-language teachers and language teachers in general to support a more active, communicative and creative approach to language learning. The design principles encompassed within TALES can only provide guidance and direction, not certainties, as each context is unique (Plomp, 2007).



Figure 6.2: Tales Model

6.5 EMBODIMENT OF THE DESIGN

This section describes the embodiment of the design in terms of the students, the teacher, the classroom setting, the curriculum, the learning approach and activities, the student grouping structures, assessment measures and the technology tools.

6.5.1 THE STUDENTS

The third-class group composed of twenty-seven students (14 girls and 13 boys) aged between eight and nine years old. Every student participated in Irish-language learning activities, including two students in receipt of an official exemption from learning Irish under the terms of DES Circular 12/96. All students spoke English with the exception of one²⁵. English was the second language of five students, with

²⁵ She moved to Ireland from Hungary mid-September 2014.

Russian, Polish or Hungarian being their first language. Six students spoke two languages at home: English and either Nigerian dialects (Igbo and Yoruba), Afrikaans, French or Latvian. One student was diagnosed with behavioural problems and four students had learning difficulties with language and mathematics; all five participated in Irish lessons. Four of these students left for special instruction (30 minutes) during our class time, but participated in activities before and after this instruction. One student joined the class in early January and another left around the same time.

I conducted a short online questionnaire with students gathering their opinions in terms of learning Irish in school and information on their computer use in both the classroom and at home. Forty one percent (n=11) of students stated that they enjoyed learning Irish and a similar percentage (n=11) stated that they 'sometimes' enjoyed learning Irish. Eighteen percent (n=5) of students did not enjoy learning Irish, however. Sixty seven percent (n=18) of students rated their computer skills as being 'excellent' with the remaining students rating their skills as being 'good'. Interestingly, no student selected the 'poor' category. The majority of students (59%, n=16) preferred to work together on learning activities with 37% (n=10) of students selecting pair work as their favourite way to work and 22% (n=6) selecting group work.

6.5.2 THE CLASSROOM TEACHER

The classroom teacher has 13 years' experience as a primary school teacher and has been with this particular school from the beginning of her teaching career. In terms of the Irish curriculum, she felt that the content was 'accessible' to students but found that there was 'not a huge amount of engagement' in her classes (Interview 1). She wondered if they were 'too teacher-centred' and she often felt that she was 'forcing them into forming sentences' (ibid). She also mentioned the lack of sense of achievement she derived from her Irish classes:

Sometimes you'd finish lessons you'd feel "they got that and they liked that", even if they didn't like that, they understood it, and they really got somewhere, and I achieved my objective. You don't get that with Irish...I think a lot of energy goes into an Irish class, but being able to gauge how much they learn and how much they want to learn is very hard (ibid).

In terms of her use of technology in her teaching, she states: 'I use technology quite a lot. Probably a bit more than most teachers in the school...I'm kind of willing to spend the time at it' (ibid). She uses slideshow and presentation software to deliver content and she also uses classroom management tools such as ClassDojo²⁶ and Edmodo²⁷ to share achievements, activities, homework and reminders with her students and their parents. She employs technology in her Irish, English and Maths lessons on a daily basis such as interactive learning materials and games for the IWB. She uses TG4²⁸ (Irish-language television channel) and the Cúla Caint²⁹ (vocabulary building app) and Puppet Pals³⁰ (cartoon creator app) applications in her Irish lessons. She sometimes video records students role playing (drámaíocht) in Irish: '...when they finish a story in the book, they act it out and we record it, and they can watch it back' (ibid).

6.5.3 THE CLASSROOM SETTING

The primary school is located in a large suburb outside Cork city. I travelled 440km round trip to my research school each week. The topology of the classroom consisted of front-facing students oriented towards the teacher and interactive whiteboard (IWB).

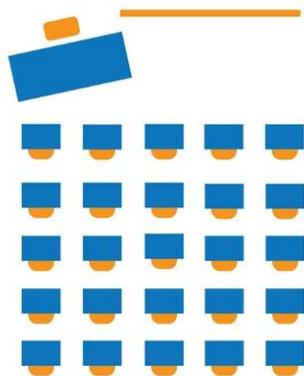


Figure 6.3: Classroom Topology

²⁶ <https://www.classdojo.com/>

²⁷ <https://www.edmodo.com/>

²⁸ <https://tg4.ie/ga/>

²⁹ <https://www.cula4.com/ga/dean/aipeanna-cula4/>

³⁰ <http://www.polishedplay.com/support-pp2>

The classroom was north facing with little natural light entering the room. Students' artwork and subject posters hung on the walls. In terms of technological resources, the teacher used a laptop connected to the IWB. The positioning of electrical sockets, which ran along the front and back walls of the room, influenced the way technology could be used in the classroom. Students had access to two laptops and two desktops at the back of the classroom, but rarely used them. They visited the computer room for a forty-minute technology class twice a week, where each student had access to a desktop computer.

This traditional spatial arrangement did not facilitate collaborative and student-centred approaches to learning (Knobel & Lankshear, 2006; Tondeur et al., 2015). We therefore incorporated a cluster layout into the classroom design (Tondeur et al., 2015) and used electrical extension leads to position and charge laptop devices in each of these clusters. In addition to my own laptop, the teacher's laptop and the two classroom laptops, I acquired four more for my research study, enabling eight clusters of three to work on each of our eight devices. The two desktops were used for online inquiry and as a backup in the event of one of the laptops not working.

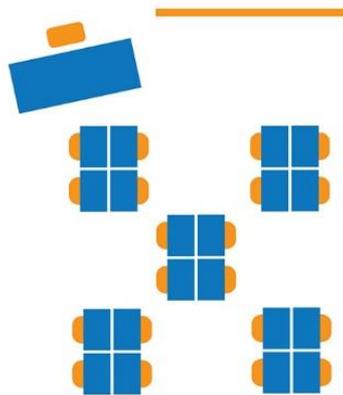


Figure 6.4: Cluster Topology for Innovative Activities



Figure 6.5: Students Working Collaboratively

The classroom teacher preferred the computer room for all technology-integrated learning, however, as she felt the classroom space was not suitable: 'It's very difficult in a classroom because it's not just there, sit down, go! In theory, it's brilliant and the benefits are massive, but it's just not practical' (Interview 2).

6.5.4 STUDENT LEARNING APPROACH

Tabak (2004) distinguishes between exogenous and endogenous design. The former refers to the instructional strategies, curricular materials and learning tasks that are developed specifically for research. The latter refers to the materials and practices already in place in the local setting (Tabak, 2004). In this study, the exogenous design represents the innovative approach, while the endogenous design represents the traditional approach. The endogenous design is an inevitable part of the innovation and thus an 'organic part of the supports for learning' (ibid, p. 227). I

believe that the combination of exogenous and endogenous design contributed to the success of this innovation, and not as a result of the exogenous design alone. As discussed in chapter 3, a standard Irish lesson is broken into three phases to include the pre-communicative, communicative and post-communicative phases (DES, 1999, p. 44; DES, 2007a, p. 4). We maintained this curricular approach throughout the intervention.

6.5.4.1 CURRICULAR APPROACH

The teacher normally allocated four hours per week for Irish lessons. Findings from my national teacher questionnaire indicate that four hours is the typical amount of time teachers (28%, n=126) spend on Irish each week, with 21% (n=95) of respondents spending 4.5 hours and 22% (n=101) spending 3.5 hours – the curriculum recommendation. Respondents indicated in their comments, however, that Irish is also spoken in the classroom throughout the schoolday: 'I use a lot of Gaeilge neamhfhoirmiúil i rith an lae' (I use a lot of informal Irish during the day). Worryingly, one respondent stated: 'Try to do more, start every year full of enthusiasm, soul is destroyed by Christmas by lack of progress and interest from class'.

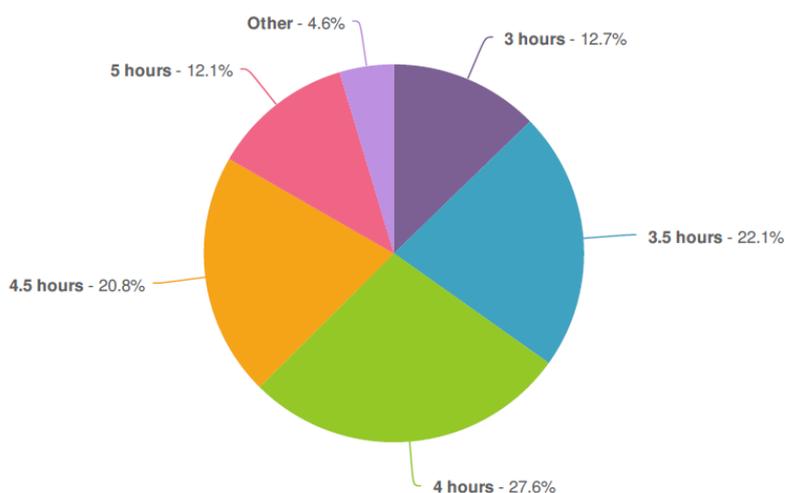


Figure 6.6: Time Spent on Teaching Irish each Week

The teacher spent two weeks (8 hours) covering each textbook chapter. We maintained this approach in our research design and worked collaboratively on each chapter. Learning activities involved a blend of endogenous and exogenous design. The teacher undertook her usual approach in Irish lesson delivery each Monday (one hour) and Thursday (one hour). She introduced a new topic on the first Monday (pre-communicative) and incorporated communicative learning activities into her teaching the following Thursday and Monday (communicative). She summarised this topic (post-communicative) on the last Thursday of each two-week period. The teacher and I implemented our innovative activities each Wednesday, further embedding content in a more natural, seamless and communicative way. Students composed their storyboards on the first Wednesday and their digital artefacts on the second Wednesday. Wednesday was chosen as the day to engage in innovative activities as midweek is the best time to ‘get an accurate picture of day-to-day classroom activity’ since absenteeism and energy levels fluctuate at the beginning and end of the week (Jesse, 2001, p. 32). We covered 14 chapters in this way and students created 520 digital and animated stories and 135 storyboards during this time.

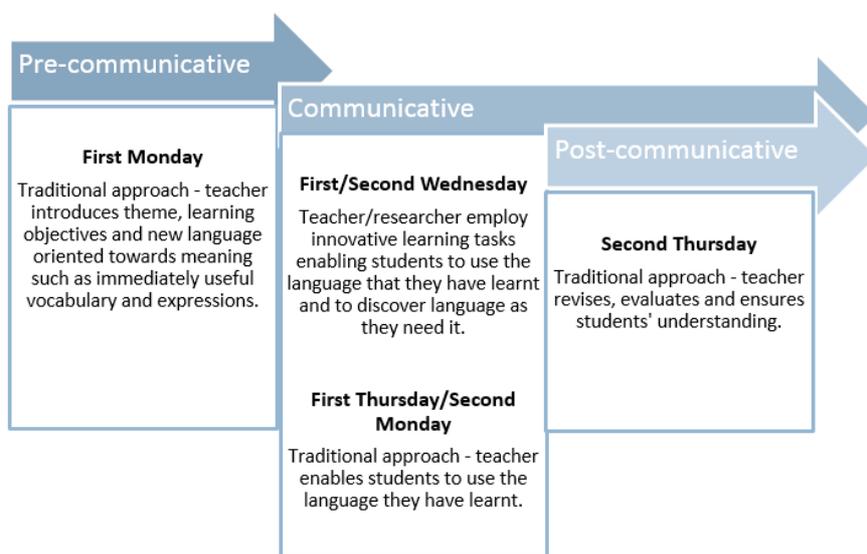


Figure 6.7: Irish Lesson Delivery over a Two-Week Period

6.5.4.2 TINKERING APPROACH

The tinkering approach employed in the classroom is an aspect of exogenous design that was incorporated into this research study. As aforementioned, it is rooted in constructionist learning theory (Papert, 1993a). The Four Ps of Creative Learning – **Projects, Peers, Passion and Play** (Resnick, 2014) directed the design and implementation of innovative language learning activities in the classroom, where students engaged collaboratively on meaningful tasks in a creative exploratory way. This playful approach of tinkering, while initially associated with coding (Papert, 1993b), may also be extended to any technology-enhanced learning environment where students become creators. In this study, students tinkered with technology tools to achieve established learning outcomes and they often achieved more. In design cycle two, for example, the teacher demonstrated how to add a new background to an animation project and how to add depth and perspective through object placement and sizing. Students not only built this into their stories, but extended it by customising backgrounds, characters and props to further enhance their animations.

In addition to the Four Ps of Creative Learning, design activities encompassed the four principles for effective collaborative project-based learning in the classroom (Barron et al., 1998). These included challenging and relevant learning tasks; appropriate scaffolds; frequent opportunities for reflection; and social participation. Individual accountability, an important factor in collaborative learning (ibid), was also built into this design where each student had to complete a task (a scene in the story) in order to complete the overall task (the story). Students were encouraged to explore, construct and reflect upon their learning, and to use the language that they had already learnt, thus meeting my first design requirement.

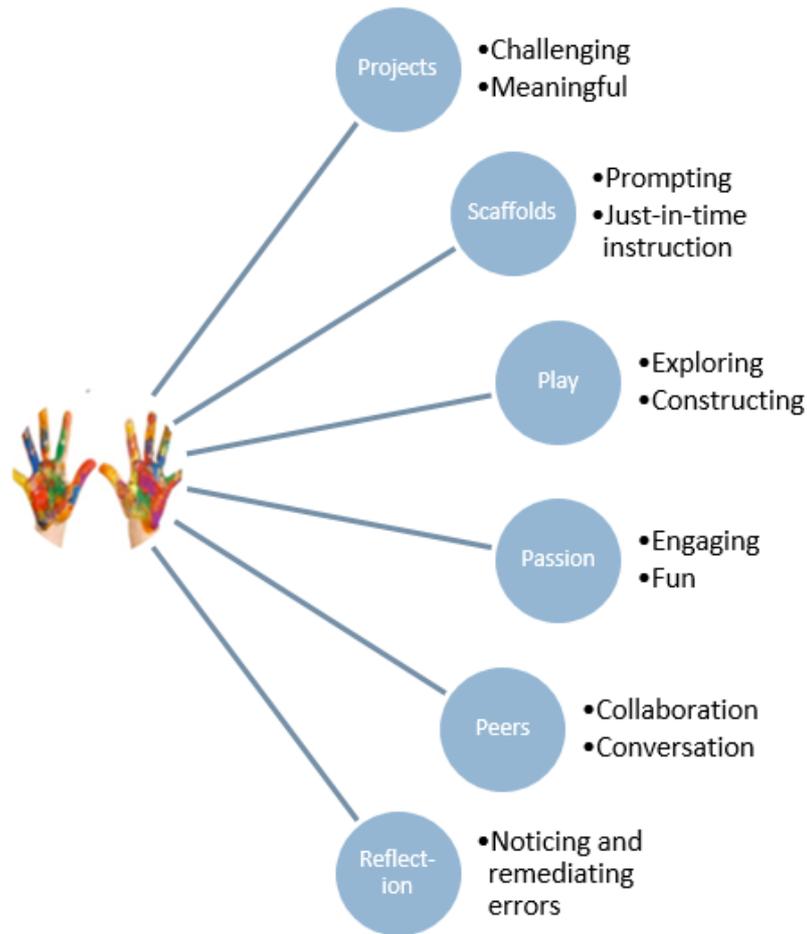


Figure 6.8: Tinkering Approach

6.5.4.3 TEXTBOOK CHAPTER DELIVERY

Curriculum coverage was a concern for the teacher. She felt under constant pressure to cover it in its entirety. Prior to the intervention, she stated 'the overload of curriculum, there is no time. Like the curriculum is massive...it's just huge (Teacher, August 2014). I maintained this aspect of endogenous design by aligning Irish-language learning activities with the Irish textbook *Bun go Barr*. Each chapter in the textbook is associated with one of the ten themes outlined in the Irish curriculum³¹.

³¹http://www.curriculumonline.ie/getmedia/920c3fd9-1f53-4163-a045-90f07ebb6b71/PSEC01b-Gaeilge_curriculum.pdf

The following table outlines the two chapters covered each month and the learning objectives associated with each chapter encompassing a particular curricular theme. We followed the textbook but tweaked the order in which some of the chapters were delivered.

Table 6.1: Textbook Chapter Delivery

Month	Week	Theme	Learning Objective	Chapter Title	Approach
September	1	Súil Siar	Súil Siar	1 Dia Duit!	Observation
	2			2 Brioscaí	Observation
	3 & 4			3 Cá bhfuil Gordó?	Observation
October	5 & 6	Súil Siar	Súil Siar	4 Cartúin	Observation
	7 & 8	Ócáidí Speisialta	Foclóir	6 Oíche Shamhna	Iteration 1
November	9 & 10	An Scoil	Foclóir	5 Rossa Bocht	Iteration 1
	11 & 12	An Aimsir	Ainm Briathartha Mothúcháin Caitheamh Aimsire	7 Lá sa Pháirc	Iteration 1
December	13 & 14	Siopadóireacht	Foclóir	9 Sa Bhaile Mór	Iteration 2
	15 & 16	Ócáidí Speisialta	An Fhoirm	10 An Nollaig	Iteration 2
			Cheisteach Siopadóireacht Bronntanais		
January	17 & 18	Rogha	Foclóir	Ceacht Naíonáin	Iteration 2
	<i>Bris-eadh ón dtéacs-leabhar</i>	Théama: Dathanna Aimsir Bia An Scoil Mé Féin			

February	19 & 20	Aimsir & Éadaí	<i>Séasúir</i> <i>Laethanta</i> <i>na</i> <i>Seachtaine</i>	8 Siúlóid sa Choill	Iteration 2
	21 & 22	Free Play	<i>Dúlra</i>	16 Sneachta* Do Rogha Féin	Iteration 3
March	23 & 24	Mé Féin Aimsir Bia Sa Bhaile	Gortú Corp Mothúcháin Cistin	11 Ag Scátáil sa Pháirc	Iteration 3
	25 & 26	Éadaí Bia	Corp Urú	12 Subh	Iteration 3
April	27 & 28	An Scoil	Gortú Corp An t-ainm briathartha	15 Timpiste sa Chlós	Iteration 3
	29 & 30	Leabhar, dán, cartún is ansa leat a chumadh ina scéal		Do Rogha Féin	Iteration 3
May		Sa Bhaile	Timpeall an Tí	13 An Seomra Codlata	Exit Site
		Am	Obair Tí	14 Mamaí Bhocht	
June		Caitheamh Aimsire	Foclóir	17 Sos do Dhaidí	
		Aimsir	Míonna Séasúir	19 Ag Súgradh sa Pháirc Súil Siar	

6.5.5 STUDENT LEARNING ACTIVITIES

I employed a learning activities' framework developed by Van den Akker (2007) to guide my design of student learning activities. It is made up of ten components addressing specific questions in relation to student learning including rationale, learning objectives, content, activity, teacher and researcher roles, location, time, resources, grouping and assessment. The following table outlines the framework employed in our instructional intervention.

Table 6.2: Learning Activities

Learning Activities	
Rationale or Vision	<ul style="list-style-type: none"> To improve language ability in Irish To enhance attitude towards the Irish language
Aims & Objectives	<ul style="list-style-type: none"> To integrate four language skills in a fun, natural, communicative and authentic way To develop digital fluency and 21st century skills
Content	<ul style="list-style-type: none"> Irish-language constructs (curricular themes and learning objectives encompassed within textbook chapters) Various technology skills in image and audio editing, online searching, digital story creation, animation and coding.
Learning Activities	<ul style="list-style-type: none"> Students learn through storytelling
Teacher Role	<ul style="list-style-type: none"> Traditional Irish lessons involving whole-class instruction Innovative Irish lessons involving short bursts of instruction followed by facilitation of collaborative learning in dyads and triads
Researcher Role	<ul style="list-style-type: none"> Innovative Irish lessons involving short bursts of instruction followed by facilitation of collaborative learning in dyads and triads
Time	<ul style="list-style-type: none"> Students spend four hours a week learning Irish The teacher spends two weeks covering each textbook chapter Each learning activity requires two weeks to complete and involves a combination of traditional and innovative approaches Traditional Approach: <ul style="list-style-type: none"> First and second Monday (1 hour each) where a new topic is either introduced or advanced First and second Thursday (1 hour each) where the topic is advanced or summarised Innovative Approach: <ul style="list-style-type: none"> First Wednesday: Students create their storyboards in dyads (2 hours)

	<ul style="list-style-type: none"> ○ Second Wednesday: Students create their digital artefacts in groups of three (2 hours)
Location	<ul style="list-style-type: none"> ● Classroom – students learn together. There is a buzz of conversation and activity ● Computer room – students convene in the computer room at the beginning of each iteration and play with the new technologies. Each student sits at a desktop computer tinkering with the tool and learning basic skills. There is a sense of awe and comradery as students experience and share new learning
Materials & Resources	<ul style="list-style-type: none"> ● Paper-based storyboard templates, pencils and coloured pencils ● Dictionaries, textbooks and reference lists ● Clocks ● Laptops, desktops, earphones and microphones ● Technology applications such as an image editor, a sound editor, a search engine, a digital storytelling tool, a digital animation tool and a programming tool
Grouping	<ul style="list-style-type: none"> ● Students work in dyads during the storyboarding activity and in triads during the digital creation process ● Groups are mixed ability and devised by teacher
Assessment	<ul style="list-style-type: none"> ● Formative assessment of digital artefacts ● Formative assessment of conversation during composition and creation (spontaneous discourse unrelated to curricular content was not the focus of this study) ● Summative assessment of learning via two standardised tests ● Before and after student questionnaires to compare attitudes ● Monthly feedback sessions to monitor student attitudes

6.5.5.1 LANGUAGE CONTENT

Students in English-medium schools develop listening and speaking skills from junior infants onwards (DES, 2007a). They begin to develop their reading and writing skills in second or third class (ibid). It is expected that students will have a good foundation in English reading and writing skills at this stage and that some of these skills will transfer to Irish reading and writing skills (Hickey & Stenson, 2011; NCCA, 1999; Parsons & Liddy, 2009). Both languages share some common sounds, but ‘some sound–spelling mappings conflict in the two languages’ (Parsons & Liddy, 2009, p. 9). Our students began to develop Irish reading skills in second class

and embarked on writing skills in third class (Interview 1). Interestingly the teacher felt that Irish writing activities at this level were 'very teacher-led' and 'very prescriptive...there is very little of their own in their writing' (Interview 1).

The teacher and I emphasised form-related meaning during our innovative activities, reinforcing the communicative significance of vocabulary and grammatical points encountered during the pre-communicative stages of the activity. Collaborative design tasks encouraged students to think and talk about the Irish language in their storytelling, especially in terms of correct sentence structure, grammar and vocabulary-use. Cazden (1979) differentiates between a speech event and a speech situation. The former is one in which rules govern the use of speech, such as a teacher-led grammatical lesson about personal pronouns. The latter is organised in terms of some nonverbal activity, such as a tic-tac-toe game, where 'rules for speaking' are not constituted (Cazden, 1979, p. 3). We encouraged speech situations during the design activities as students were stimulated to use the language they already knew and to search for new language they needed while composing their stories. Speech events spontaneously arose as students grappled with language, resulting in scaffolded instruction leading to correct form.

The following topics were incorporated into the 12 design-based Irish-language learning activities:

1. Halloween (Oíche Shamhna)
2. In School (Ar Scoil)
3. At the Park (Sa Pháirc)
4. Preparing for Christmas (Ullmhúchán don Nollaig)
5. Christmas (An Nollaig)
6. Colours (Dáthanna)
7. Spring (An tEarrach)
8. Winter (An Geimhreadh)
9. Myself (Mé Féin)
10. Food (Bia)
11. Body (An Corp)
12. Your Story of Choice (Do Rogha Scéil)

The majority of Irish activities in this study focused on the following four grammatical constructs:

- An síneadh fada (acute accent) – a single vowel and the length difference, where a stroke over the vowel indicates that it is long (Hickey & Stenson, 2011; Parsons & Liddy, 2009):
 - mo (my) vs. mó (more)
 - fear (man) vs. féar (grass)
 - na (the, plural) vs. ná (nor)

- Séimhiú (lenition) – when to use a ‘h’ after the initial consonant in a noun and the resulting change in pronunciation (Hickey & Stenson, 2011; Parsons & Liddy, 2009):
 - /b/ in bord (table) becomes /w/ or /v/ in bhord, depending on the dialect³²

- Urú (eclipsis) – when to mark a consonant at the beginning of a word with an eclipsis such as **bp**, **mb**, **bhf**, **dt**, **nd**, **gc** and **ng** and the consequential change in pronunciation (Hickey & Stenson, 2011; Parsons & Liddy, 2009):
 - Following possession or úrú such as ‘ar an mbord’ (on the table), ár ngúnaí (our dresses)

- An tAinm Briathartha (verbal noun):
 - ag rith (running)
 - ag ithe (eating)
 - ag snámh (swimming)

The teacher and I spoke Irish to each other and to the students at all times. We prompted, recasted or translated sentences whenever students experienced difficulty with the target language. All language and computer activities were mediated through Irish. Irish computer terminology hung on classroom walls and the programming application (Scratch) that we employed was localised to Irish across all devices in the classroom and the computer room. Students were encouraged to use whatever Irish they had at their disposal. Our aim as Irish-language teachers was to cultivate a ‘tolerant, supportive, affirmative atmosphere in class which would

³² Three main dialects exist in the Irish language: Munster, Connaught and Ulster.

promote a high level of pupil participation and personal expression' (Harris & Murtagh, 1999, p. 11).

6.5.5.2 GROUPING

Learning activities were undergirded by a socioconstructivist perspective, encouraging collaboration, communication and creativity as students co-constructed and reconstructed their stories in both paper and digital formats, extending their individual ZPD in the process. As Blumenfeld et al. (2006) found in their study, it took a while for students to adapt to this new approach to learning as they had to 'adjust to new relationships with their teacher [and] with each other inside the classroom' (p. 478). They now engaged more than usual with each other and their teacher during innovative activities, and through a different language for the most part.

Oakley et al. (2004) recommend that teachers should form the groups and not students as stronger students tend to seek one another out. When a group is composed of strong students only, they tend not to engage with the subject at a deeper level and tend not to develop good teamwork skills as they have less opportunity to resolve discrepancies in understanding (Oakley et al., 2004). Conversely, groups composing of all weak students are likely to 'flounder aimlessly or reinforce one another's misconceptions' (Oakley et al., 2004, p. 11). Oakley et al. (2004) suggest forming mixed ability groupings of three to four students as weaker students can benefit from stronger students in terms of their input and how to approach a task, and they can also receive individual tutoring. In reciprocation, stronger students' understanding is reinforced and embedded at a deeper level. In this way students learn collaboratively, clarifying and deepening their understanding of the language, thus meeting my second design requirement. The teacher organised students into groups of mixed ability and reshuffled the groups every two weeks after the completion of each chapter (story). She placed them into dyads for the storyboarding activity. She corrected the stories and selected nine for digital recreation. She placed students into triads keeping the original dyad of the selected storyboard intact. We were attentive to group dynamics at all times and aware of how certain behaviours could limit the positive effect of collaboration, especially dominant members, clashing members and members failing to contribute (Mascolo, 2009).

6.5.5.3 TECHNOLOGY

I adopted the SECTIONS framework in guiding my selection of technology tools (Bates & Poole, 2003). SECTIONS is an acronym for:

- Students (their learning needs, age and abilities)
- Ease of Use
- Cost
- Teaching and learning
- Interactivity (not simply viewing, reading and listening)
- Organisation (device, installation, Internet access, platform)
- Novelty (engaging, motivating)
- Speed (quick to implement and create with)

I explored a plethora of technology applications prior to the intervention and collected qualifying applications into one space using Symbaloo³³ – an online social bookmarking service and visual resource management tool. My Symbaloo of applications included those that were either free to use or available to purchase at a heavily discounted educational price. Applications were organised into categories and each category was colour-coded to indicate its function:

- Green for online search tools
- Red for digital storytelling tools
- Orange for comic editors
- Teal for photo editors
- Red for digital animation tools
- Blue for writing tools for storyboarding, quizzes and word clouds
- Yellow for clipart websites
- Purple for audio editors
- Brown for interactive poster tools
- Grey for video editors

³³ <http://www.symbalooedu.com/about/>



Figure 6.9: Symboloo of Technology Tools

It was important to select multimedia technology tools that were usable, appropriate for the student, open source where possible, and either free or relatively inexpensive. Gilbert (2002) defines these kinds of technologies as Low Threshold Applications (LTAs) as they are low in cost, easy to learn, accessible, reliable and amenable. Based on the SECTIONS guidelines and the conditions associated with LTAs, I developed the STORIES framework outlining the criteria for technology tools appropriate for digital and animated storytelling in the classroom, thus meeting my third design requirement. STORIES is an acronym for:

- Student email addresses are not required
- Text capability
- Online application
- Voice Recording feature
- Image design/editing/importing feature
- Educational/Free licence
- Stretchable functionality

Three key technology applications were chosen based on my STORIES framework and incorporated into design-based language learning activities. These included:

1. Little Bird Tales³⁴ (LBT) – a simple digital storytelling application that required minimum instruction to use effectively. It provided a good platform to introduce concepts such as story structure, design and online searching. It had a ceiling, however, in that it was limited in its functionality (Gargarian, 1996).
2. Go Animate for Schools³⁵ (GA) – a digital animation application that was more advanced and had no ceiling in that students could ply and manipulate its functionality to create animations in new ways.
3. Scratch³⁶ – a programming application used to create digital animations. This too had no ceiling and students were only bound by their imaginations.

Little Bird Tales and Scratch were both developed with the needs of students in mind (Sherin et al., 2004). Go Animate for Schools, however, is an example of a learner-adapted artefact as it is a simplified version of a more powerful application, thus 'helping to constrain the activity of the learner' (Sherin et al., 2004, p. 405). The Go Animate application is aimed at professionals creating animations for digital marketing, training and explainer videos, and presentations.

6.5.5.3.1 DESIGN AND SEARCH TOOLS

We also employed a selection of design and search tools in our intervention, selected using my STORIES framework. Students were introduced to a dedicated clipart website aimed at young children called My Cute Graphics³⁷ (MCG). As they could search for clipart using the image categories, this diminished the need to use English in their searches.

³⁴ <https://littlebirdtales.com/>

³⁵ <https://goanimate.com/>

³⁶ <https://scratch.mit.edu/>

³⁷ www.mycutegraphics.com



Figure 6.10: My Cute Graphics Website

We also used an audio recording web application called Vocaroo³⁸ and a paint studio called ABCyapaint³⁹ – a more advanced online audio editor and design studio compared to those built into LBT, GA and Scratch.



Figure 6.11: Vocaroo Audio Web Application

³⁸ www.vocaroo.com

³⁹ http://www.abcya.com/abcya_paint.htm



Figure 6.12: ABCya Paint Web Application

Students also used an online search engine called DuckDuckGo⁴⁰. Unlike Google, this site protects a user's privacy by not personalising their search results or profiling its users. It was also possible to localise this website to Irish and to switch off all advertising. This made it child-friendly and more conducive to Irish-language learning.

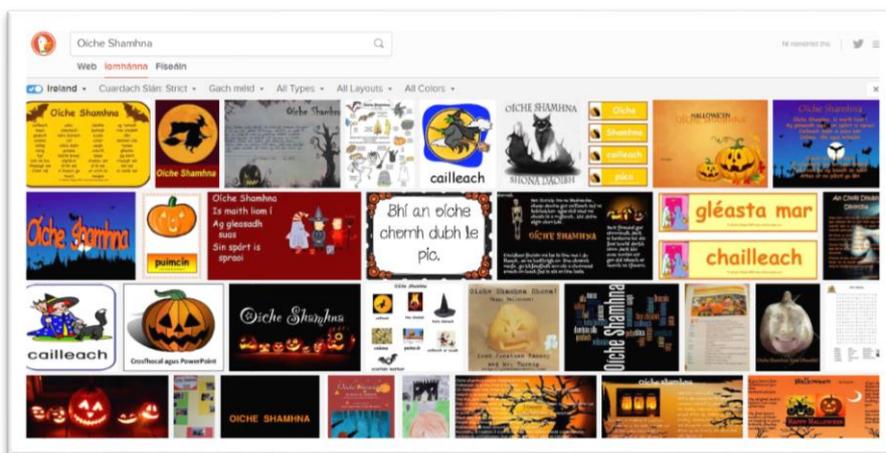


Figure 6.13: Searching for Halloween Images in Irish on DuckDuckGo

⁴⁰ www.duckduckgo.com

6.5.5.3.2 TECHNOLOGY INTEGRATION

The classroom intervention started out with a relatively simple use of technology in the form of digital stories (Iteration 1), working up to digital animation (Iteration 2) and eventually to computer coding (Iteration 3). This enabled effective integration of technology into classroom pedagogy and a productive pathway to achieve ‘high-end instructional goals’ (Ertmer, 2005, p. 33). Each technology pushed the learning curve and brought with it new challenges, thus consistently maintaining student interest. Students moved seamlessly from simpler applications to more advanced applications during the course of the year as each iteration provided them with the skills to do so, indicating learning transfer. When students became competent in using these technologies, mental effort was ‘devoted to the intellectual task of creating artifacts, not to the details of production’ (Blumenfeld et al., 1991, p. 386).

In terms of teaching students how to use the various technology applications, there was very little direct instruction involved. The teacher and I demonstrated the technology in the classroom and computer room around the idea of a story and prompted students for their input. They did not receive handouts. We incorporated short instruction bursts of five minutes in duration where the learning objective was explained and the key tools and steps in creation were modelled. This approach facilitated ‘learning things that would take an instant or when little benefit would be gained by investigating it yourself’, such as being shown ‘how to use a tool or told a useful bit of information’ (Martinez & Stager, 2013, p. 72). Carver (2006) also notes how ‘well-timed direct teaching can be a catalyst for enhanced learning from more open-ended experiences’ (p. 213).

Students’ initial interest and excitement were buoyed through periods of free play ‘without the fear of any repercussions’ (Lim et al., 2006, p. 223). Armed with the basic skills, they explored and played freely with each application before creating their stories in earnest. Such free play enabled students to experiment and discover functionality in a fun way, growing in confidence and skill. They were ‘unafraid to make mistakes’, thus enhancing their ‘desire to “try everything”’ (Sandholtz et al., 1994, p. 15). Students also shared what they learned with each other, deepening their own understanding of the tools in this process.

In terms of ensuring that technology impacted learning, we followed Puentedura's (2012) Substitution Augmentation Modification Redefinition (SAMR) model, which outlines the progression and impact technology can have in the classroom.

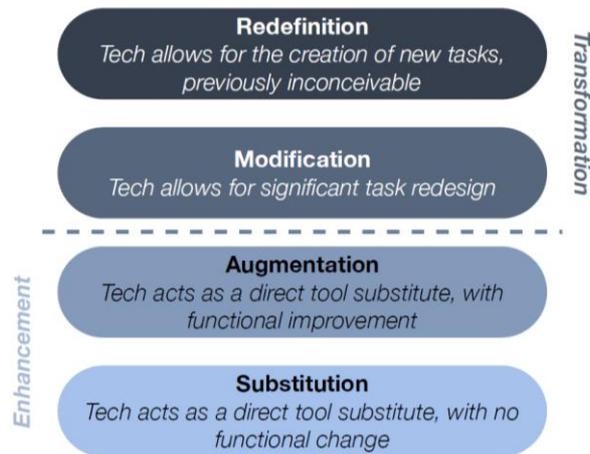


Figure 6.14: SAMR Model (Puentedura, 2012, p.6)

Substituting a learning task with technology to achieve the same functionality is of little value, such as exchanging a paper-based worksheet for an online one. In terms of Augmentation, there is little functional improvement only that the technology offers a more effective way to perform a task such as word clouds instead of paper-based word lists. Modification results in significant functional change in the classroom, however, where technology allows for significant task redesign. One such example is using Socrative to deliver a quiz to students as opposed to a paper-based one, making it more interactive for students and efficient for teachers in returning feedback immediately, and also in viewing student learning analytics. Redefinition enables new tasks that were previously inconceivable. This intervention encompasses learning activities involving such transformation where students create and recreate their stories in multiple formats, deepening learning and enhancing fluency in both language and technology use.

6.5.5.3.3 SCAFFOLDS IN THE CLASSROOM

Kennedy (1991) estimates that a student in a class of fifteen may have ‘five interactions with the teacher during a 50-minute period’ (p. 51). One can assume that this would be halved in a classroom of double that number, which is the typical size of Irish classrooms. A scaffolding approach increases teacher-student interaction and supports students' learning within their individual ZPD (Mascolo, 2009) enabling them 'to achieve a goal or action that would not be possible without that support' (Guzdial, 1994, p. 3). Through encouragement, explanation, explicit instruction, guidance, modelling and decomposing tasks into smaller ones, students learn to complete tasks independently. Technology scaffolds the structure of design tasks by guiding and focusing students on the activity, and by reducing the degrees of freedom through decomposing the activity into smaller steps (Reiser, 2004). Technology also scaffolds the epistemic knowledge of language learning through the process of digital recreation, summoning students to discuss and reflect on language meaning and form.

The TALES model encompasses four scaffolds: the storyboard template; technology tools; teacher interaction through prompting, modelling and questioning; and peer interaction through coaching, modelling, listening, questioning, negotiating and reflecting.

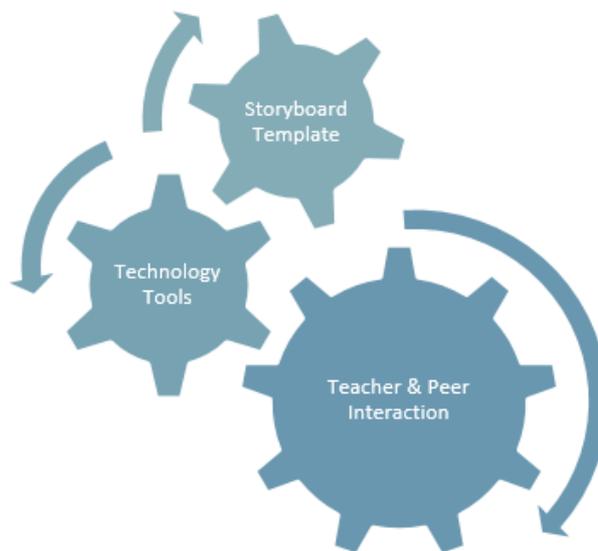


Figure 6.15: Scaffolds Incorporated into TALES

Student learning is facilitated through the combined synergistic contribution of students, teacher and learning tools working together as a system (Reiser, 2004; Tabak, 2004). Students completed tasks that they would otherwise have not been able to do if left unassisted. In designing zones of proximal development into language learning activities, the teacher and I encouraged students to tinker and play with technology tools, to explore and ask questions around language, and to seek assistance from us and their peers as well as provide assistance to others. As students internalised new knowledge in each learning topic, teacher scaffolding for those topics was gradually reduced and eventually removed. The storyboard template and technology tools are central and constant in the language learning environment, and guide and structure learning activities to reduce their complexity. Pea (2004) questions technology as a scaffold, however, since it does not fade in its use. In TALEs, fading occurred in terms of the teacher's assistance in using these scaffolds as this tapered over time as students became more competent in their use. In terms of other learning resources in the classroom such as dictionaries, textbooks and vocabulary lists, I felt they functioned more as learning tools and not scaffolds in the learning process. They enabled students to take ownership of their learning as they became more independent in their pursuit of knowledge.

6.5.5.4 ASSESSMENT

Formative assessment of individual student learning was process-oriented and was supported through teacher observations and scaffolding opportunities as students created their digital and animated stories. This promoted a deeper understanding of theories and practices associated with language learning, thus informing the design of innovative language learning activities (Fullan & Donnelly, 2013).

Formative assessment is categorised as Assessment for Learning (AfL) (NCCA, 2007). It fits better with a constructivist approach to learning as it encourages social discursive practices in the classroom (Pryor & Crossouard, 2008). AfL approaches are student-centred (Nic Craith, 2010), facilitate feedback for immediate action (Gattullo, 2000) and have the 'potential to make a significant difference to student achievement' (O'Leary, 2006, p. 10). It is more concerned with the process of learning rather than the final product (Carver, 2006; Maxwell, 2001) as it is generally part of the classroom routine and does not break the flow of teaching and learning

(NCCA, 2007; Nic Craith, 2010). It is viewed as a subjective evaluation of performance and therefore difficult to assess (Pillar, 2011).

In their nationwide study into literacy and instructional practices, the INTO (2011) found that 71% of teachers rarely or only sometimes used AfL techniques in their Irish-language lessons. These findings conflict with mine, however, where 80% (n=360) of teachers who responded to my national teacher questionnaire measured student learning gains through observation, a form of AfL, in 'almost all' Irish lessons. That said, only 36% (n=161) of teachers provided their students with oral feedback in 'almost all' of their Irish lessons. I also found that 86% (n=387) of teachers 'never' or 'almost never' used grades as a way to assess their students' learning gains in Irish.

The teacher and I observed student learning and participated in regular constructive conversations with students about their learning (Kozma, 2011; Maxwell, 2001; NCCA, 2007; Parsons & Taylor, 2011). Students also engaged in self-assessment as they drafted, revised, edited, created, reflected upon and shared their digital and animated stories, enhancing their metacognition skills in the process (NCCA, 2007; Parsons & Taylor, 2011). Students also engaged in peer-assessment when they reviewed and corrected each other's stories.

As was expected, the teacher also assessed the students summatively at the end of each of the three terms – Christmas, Easter and summer. Summative assessment is categorised as Assessment of Learning (AoL) (NCCA, 2007) and involves 'periodically recording and reporting information on children's progress to parents, teachers and relevant bodies and for future planning' (INTO, 2011, p. 34). Students' learning artefacts were also assessed summatively. I designed a rubric to measure their level of success in creating their digital stories. A rubric outlines a 'definition and description of the criteria of quality that characterize each level of accomplishment' (Sadik, 2008, p. 495). The rubric I employed in this study was based on rubrics created by Scott County Schools ⁴¹ (Kentucky) and

⁴¹ <http://electronicportfolios.com/digistory/DS-rubric.pdf>

www.storycenter.org. It included eight criteria and a four-point scale where Poor = 1, Low = 2, Moderate = 3 and High = 4. The criteria of achievement encompassed storyboarding, story development, content and theme, voiceover, text, media, design and audio. I used the online Roobrix⁴² tool to score the digital storytelling rubrics.

Table 6.3: Digital Storytelling Rubric

DIGITAL STORYTELLING RUBRIC					
#	Criteria	4 points	3 points	2 Points	1 Point
1	<i>Storyboard</i>	Complete and detailed evidence of planning throughout entire storyboard (4 sketches and scripts).	Evidence of planning through most of the scenes (3 sketches and scripts).	Evidence of planning through half the scenes (2 sketches and scripts).	Little evidence of planning (1 sketch and script).
2	<i>Story Development</i>	Story line development is evident.	Story line development is somewhat evident.	Story line development is apparent.	Story line development needs more work.
3	<i>Content and Theme</i>	Content is clearly relevant to theme. Story is engaging.	Content has some relevance to theme. Story is mostly engaging.	Content has little relevance to theme. Story is somewhat engaging.	Content has no relevance to theme. Story is barely engaging.

⁴² <http://roobrix.com/>

4	<i>Presence of Voice</i>	Voice quality is clear and words are well enunciated.	Voice quality is clear and words are well enunciated throughout the majority of the presentation.	Voice quality is clear and words are well enunciated throughout half of the presentation.	Voice quality and enunciation needs more attention.
5	<i>Presence of Text in Storyboard & Digital Artefact (morphologically, syntactically, semantically)</i>	Language is grammatically correct, word order is correct, and vocabulary is extensive and appropriate.	Language is grammatically correct and word order is correct for the most part. Vocabulary is typical and appropriate.	Some of the language is grammatically incorrect and word order too. Vocabulary is limited.	Most of the language is grammatically incorrect, word order too. Vocabulary is inadequate.
6	<i>Choice of Media</i>	Background images, characters and props suit the storyline well.	Background images, characters and props somehow suit the storyline.	An attempt was made to use background images, characters and props, but needs more work.	Little or no attempt to use background images, characters and props.
7	<i>Design GA & Scratch: (Transitions, composition, animation, special effects, coding)</i>	Strong use of design and is appropriate to the subject matter.	Some elements of design and most are appropriate to the subject matter.	Very few elements of design and some are appropriate to the subject matter.	Few elements of design present.

	<i>LBT: drawn images)</i>				
8	<i>Audio Soundtrack & Effects</i>	Music and sound effects enhance the story.	Music and sound effects, for the most part, enhance the story.	Music and sound effects barely enhance the story.	Music and sound effects are distracting and inappropriate for the most part.

6.5.5.5 DATA COLLECTION IN THE CLASSROOM

At the end of each innovative session, the teacher and I engaged in a debrief meeting in order to discuss any feats and issues that had arisen in class, along with any ideas for forthcoming lessons. I also updated computer software and organised computer files and folders. Upon leaving the school premises, I would log my reflections as soon as possible. For the remainder of the week, I would focus on transcribing the video footage (~1.5 hours), audio recording (~45 minutes) and student feedback sessions. I also scanned student storyboards and filed them with their associated digital stories.

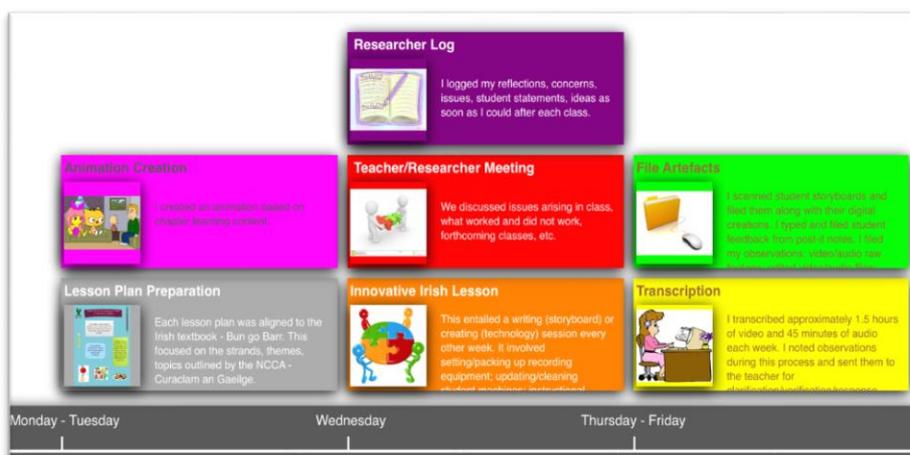


Figure 6.16: Data Collection in the Classroom

6.6 CONCLUSION

In this chapter I have outlined the design process undertaken in this instructional intervention in terms of conjectures and requirements. I have discussed the embodiment of the design in relation to the students, the classroom setting, the student learning approach promoted in the classroom, the student learning activities, language content, grouping structures, technology tools and the assessment procedures adopted during this intervention. In the following three chapters, I describe each of the three iterations - pilot, mainstream and capstone (Hall et al., 2016), paying particular attention to conflicts arising in student learning and the resolutions the teacher and I designed and enacted in the classroom in response to them.

7 CHAPTER SEVEN: DESIGN CYCLE ONE (PILOT)

7.1 INTRODUCTION

This chapter explores the first of three design cycles in this instructional intervention. This cycle took place over a 13-week period between early September and late November 2014. It formed the pilot cycle serving a two-fold purpose – one of observation and one of action. Initially, I observed the class teacher and students as they participated in their Irish-language lessons for the first six weeks in order to gain a better understanding of their learning environment. I triangulated data from interviews I convened with the classroom teacher and from my national teacher questionnaire with my classroom observations. I then explored the potential of digital storytelling activities for the remaining seven weeks. Issues arising during the latter part of this design cycle were resolved and served to inform the second design cycle. Such issues included group configuration schemes, technology shortcomings, the storyboard design and the overreliance on translation from Irish to English.

As aforesaid, the TALES model is predicated upon the concepts and theories discussed in chapters 2 and 5, and undergird our instructional intervention. TALES was iteratively developed and tweaked through the three design cycles in an attempt to enhance the student's experience in the Irish-language classroom by fostering a student-centred, collaborative, technology-enhanced, knowledge-construction learning environment. In light of my epistemological and ontological positions, and my approach to data collection and analysis, it was important that I provide participants with a voice as I reported my findings (Corden & Sainsbury, 2006). I endeavoured to strike a balance between my narrative and their spoken words. The TALES model also guided my selection, analysis and discussion of exemplar data or vignettes to showcase student 'learning stories' (Papert, 1993, p. 106). Irish words are accompanied by an English translation in brackets. Student actions are italicised and included within square brackets also. Students spelling words are illustrated in capital letters. In addition, I triangulated their opinions and suggestions from our student feedback sessions with my observations.

In the following sections I first describe my findings from the observational period, focusing on student and teacher interactions; the classroom setting; and Irish-language teaching and learning activities. I then proceed to discuss the second part of this design cycle where innovative Irish-language learning activities were implemented.

7.2 OBSERVATIONAL PERIOD

I conducted a preliminary study into Irish-language teaching and learning in the classroom to gain a thorough understanding of the pedagogical context (McKenney & Reeves, 2012) and to get an insight into the possible reasons for poor Irish-language learning achievement (Harris et al., 2006). I also used this time to build a rapport with the students and to familiarise myself with recording procedures. In the following sections, I discuss my observations in terms of instructional approach, student learning, Irish lesson activities and technology use in Irish lessons. I found that the teacher undertook a traditional approach to language teaching, that students were given few opportunities to speak in Irish, and that group work was non-existent. I also found that technology was employed in a traditional way with the sole purpose of delivering information.

7.2.1 INSTRUCTIONAL APPROACH

The traditional instructional approach was the norm in this classroom and involved whole-class instruction delivered through the medium of Irish, with little participation or interest from students. This aligned with findings from my national teacher questionnaire where the most common approach to Irish-language teaching at primary school level was whole-class instruction, where 51% (n=228) of teachers engaged in this approach in 'almost all' lessons.

The teacher engaged students in rote learning activities on numerous occasions. In one instance, students chorally recited a poem entitled *Humptí Dumptí* four times. First from the board, twice by heart, and once again from the board. She then selected several students to recite it individually. At one stage, a student forgot some of the words and used similar sounding words instead, indicating that he was unsure of what he was even saying. The teacher believes rote learning has a role to play in Irish-language teaching and learning stating:

Repetition and songs are a nice way to learn Irish and that's one part of Irish that I do like...you get good pronunciation from them and you get good rhythm from it, and good natural Irish from them...There are some things you just have to learn. You have to learn your grammar, you have to learn your verbs (Interview 1).

She later questions this approach, however, when she reflects on the above activity:

Even the poem, they were saying the poem...could I be sure they all knew it? Or were a lot of them just going along, you know, kind of with the rhythm of the poem and not really knowing the words (Interview 1).

She admits to struggling with teaching Irish and concedes that she does not experience this with other subjects. She describes the sense of satisfaction she derives from a mathematics' class, knowing that her students learn what she sets out to teach, and compares this with the feeling of uncertainty that lingers after an Irish class:

I did Maths today, I had my objectives in my head that they were going to be able to estimate and add so many digit numbers. And by the end of it they were all getting it right and they understood what they were doing and I thought 'yeah I had my box checked for tomorrow, I could move on'. Whereas for Irish, like today I wanted them to learn 'Thit rud éigin ar an úrlár' [Something fell on the floor] and 'An maith leat? Is maith liom. Ní maith liom' [Do you like? Yes, I like. No, I do not like]. Could I guarantee that they all got that? They said it with me, they did the written work, we corrected it, a few people answered questions about them, but could I be sure? I don't know. There's never that sense of being totally sure (Interview 1).

She questions her approach and wonders if it is 'too teacher-centred' and explains:

You're calling on kids all the time trying to get them to say things. You're almost kind of forcing them into forming sentences...you're kind of gearing them towards what they're going to say all the time (Interview 1).

Her words were echoed by one of my questionnaire respondents stating:

I find it difficult to get the pupils motivated in Irish classes. I find they don't speak spontaneously and it takes a lot of encouragement and hints to get them to interact. I find they speak very little Irish unless they are required to (NTQ).

Whilst the teacher was organised, she never made the learning objectives associated with her Irish lessons explicit to students, nor did she inform them of upcoming lesson activities. To signal the end of a lesson, she simply transitioned to English without recapping what they had learnt. She tried to cover a lot in each lesson, often racing through various activities and not developing language constructs when opportunities arose. I sensed she was under pressure and she later shared this with me during our first interview when she said: 'the overload of curriculum, there is no time...it's just huge (Interview 1). English was the natural language of the classroom and translation from Irish to English occurred frequently. The teacher often used English in her Irish class to instruct, praise, discipline, translate and explain. Students regularly slipped back into English too. The fifth lesson, in particular, was mostly conducted in English. There also appeared to be a pattern to her Irish-language lessons, which involved instruction, followed by question-time confirming student understanding, and prompting students into correctly responding to her questions.

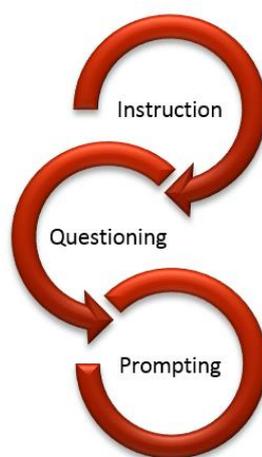


Figure 7.1: Irish Language Lesson Pattern

7.2.2 STUDENT LEARNING

Students' pronunciation was very good as was their use of intonation. In my opinion, this was due to students continuously reciting content such as stories, poems and songs. There was little or no opportunity for spontaneous language production, however, as it was mostly teacher-dominant, whole-class choral recitation with students responding to the teacher's questions when called upon. They rarely asked questions and there were no opportunities to engage in oral or creative writing activities. Students learned passively as there was no evidence of group or paired learning. In fact, all social interaction occurred between the teacher and the students and not between the students themselves. I did observe students enthusiastically engaging in a roleplay activity during this time, however. This conflicted with my national teacher questionnaire findings, where 75% (n=338) of teachers employed active learning strategies in their Irish classrooms, with one respondent stating: 'As much as possible. If children aren't actively learning they tend to tune out'. Their comments listed activities such as comhrá beirte (paired conversation), drámaí (drama), nuacht (sharing news), rólimirt (roleplay), obairghrúpa (group work) and obair bheirte (pair work).

7.2.3 IRISH LESSON ACTIVITIES

Irish lesson activities were based on curricular themes identified in their Irish textbook and centred around the four language skills and various grammatical constructs as outlined in the previous chapter, chapter 6. Typical writing activities were prescriptive and involved students writing new vocabulary, phrases and grammar points from the board into their copybooks or short answers to story questions into their workbooks. As the students wrote their answers, the teacher entered the correct responses into a writing application on her computer, displaying them in cursive writing format on the board. She then called upon individual students to answer comprehension questions from the textbook, repeating or recasting their answers when necessary. Typical oral activities involved students chorally reciting Irish poems and stories from the board or textbook. The teacher continuously mimed and gesticulated during these renditions. She asked students questions about the content, but never developed them into talking points. They also enjoyed singing Irish songs along with audio recordings and accompanying slideshows.

Aside from reading stories aloud, typical reading activities involved students completing picture series' on the IWB, where students put jumbled up pictures into the correct sequence conveying a story from beginning to end. The teacher asked students questions about these pictures, encouraging them to form complete sentences in their responses. I felt this was one of the more effective IWB learning activities in which students participated. While students engaged in colouring-in activities in the textbook, the teacher reviewed their written work and attempted to engage in conversation with them, asking simple questions such as: Cad is ainm duit? (What is your name?), Cén aois thú? (How old are you?), Cá bhfuil cónaí ort? (Where do you live?), Cé mhéad duine i do chlann? (How many people in your family?) and Cén rang ina bhfuil tú? (What class are you in?). Surprisingly, most students seemed to struggle with their answers.

As well as engaging with language skills, the teacher delivered activities around the following grammatical constructs: an aimsir chaite (verbs in the past tense); an fhoirm cheisteach (interrogative form); ag comhaireamh rudaí (counting objects); na huimhreacha pearsanta (counting people); na forainmneacha pearsanta (personal pronouns); and an réamhfhocail 'Sa' + séimhiú (preposition + lenition). Students enjoyed these type of activities and viewed them as games. One particular grammar-based activity focused on verbs in the past tense, where she listed the following verbs *Ceannaigh* (to buy) and *Clois* (to listen) with their pronouns on the board. She then asked students to translate her English sentences to Irish such as 'they bought sweets' (*cheannaigh siad milseáin*), 'I bought ice cream' (*cheannaigh mé uachtar reoite*), 'she heard the music' (*chuala sí an ceol*), 'they heard the singing' (*chuala siad an canadh*).

Her approach to teaching numbers and counting in Irish was novel and students were very much engaged and enjoyed this activity. They first counted together from one to twenty and then from ten to a hundred in tens. She then dealt a playing card to each student. As she called out numbers, students holding cards with those numbers stood up. She then counted the number of students standing up: 'duine, beirt, triúr, ceathrar, cúigear' (one, two, three, four, five) indicating the difference in Irish between counting objects and counting people. She then introduced buzzer devices. As she wrote a number on the board, the first student to buzz in got to shout out the number in Irish.

Some of her grammatical activities centred around rote learning, however, such as her activity involving interrogative particles. Students had to recite them in both Irish and English: ‘Cad, Céard, *What*, Cé, *Who*, Cathain, *When*, Conas, *How*, Cá, *Where*’ and then chorally translate the interrogative particles to Irish and English as she said them:

Teacher: Cad é an Ghaeilge ar What? [What is the Irish for What?]

Students: Cad.

Teacher: Cad é an Béarla ar Conas? [What is the English for Why?]

Students: How.

I felt this was a rather meaningless activity as the students simply memorised the content, like a rhyme, but did not use it in an authentic meaningful way. Students also learned their personal pronouns in the same way where they recited them with the teacher several times: ‘Mé, Tú, Sí, Sé, Sinn, Sibh, Siad’ (Me, You, She, He, Us, You, Them). Students pointed at themselves and to each other while rhyming off this list. The teacher then asked them for translations, for example:

Teacher: Cad é an focal ar 'I'? [What is the word for 'I'?).

Students: Mé [I].

Teacher: Cad é an focal ar 'tú'? [What is the word for 'you'?).

Students: You [you].

She then placed each pronoun into an Irish sentence illustrating its purpose. Even though there was still a reliance on repetition and translation, this was a better approach compared to the previous interrogative activity. In a follow-up lesson, the teacher reinforced this activity when she wrote the personal pronouns on the board alongside a verb in the past tense. She called upon students to translate her English sentences as she said them, incorporating both the personal pronoun and the past tense.

The following vignette reveals her approach to teaching her students how the preposition 'sa' (in the) undergoes lenition (takes a séimhiú) when used with nouns beginning with a consonant, such as 'poll, sa pholl' (hole, in the hole) and 'bosca, sa bhosca' (box, in the box). She first gave a correct example (sa bhosca), then an incorrect example (sa bosca), before finally explaining the rule (sa + h) and repeating the correct example (sa bhosca):

Féach anseo! Féach ar an bhfocal thuas anseo. Sa bhosca. Ní sa bosca atá ann. Mar le 'sa', tá 'h'. Sa bhosca [Look here! Look at the word up here. Sa bhosca. It is not 'sa bosca'. Because 'sa' takes a 'h'. Sa bhosca].

She then posed questions incorporating this grammatical construct and students answered her when called upon, for example:

Teacher: Cad atá sa bhosca anseo? [What is in the box here?]

Larry: Tá an rudaí, na rudaí, sa bosca [There are things in the box].

Teacher: Tá na rudaí sa bhosca [There are things in the box].

Peter: Tá na rudaí sa bosca [There are things in the box].

Both students answered her incorrectly, forgetting the lenition (séimhiú). Even after the teacher recasted the correct response, the second student still made the same mistake. Interestingly, Larry did correct another grammatical error (the definite article plural) when he changed 'an rudaí' to 'na rudaí' (the things). I felt that students were not interested and therefore not invested in this activity. In the next dialogue a student spontaneously offered the teacher an example of a noun that could be used to convey this point. The teacher did not ask him to demonstrate the construct, however. This was the only time I witnessed a student volunteering information during my observational period:

Teacher: Sa charr. Tá mamaí sa charr. Ní sa carr atá ann. [In the carr. Mommy is in the car. It is not 'sa car'].

Naoise: Teacher, instead of carr you could put cistin [kitchen].

Teacher: S'ea. Cistin, sa chistin. Ní sa cistin, ach sa chistin [Yes. Kitchen, in the kitchen. It is not 'sa cistin, but 'sa chistin'].

Teacher: Cá bhfuil Séamie sa phictiúr seo [Where is Séamie in this picture]?

Lisa: Sa ghairdín [in the garden].

In the following exchange, two students corrected themselves after answering incorrectly indicating some students were beginning to assimilate this new construct:

Teacher: Cá bhfuil an buidéal [Where is the bottle]?

Aileen: Bhí an buidéal sa mála...sa mhála [The bottle was in the bag...in the bag].

Teacher: Cá bhfuil an buidéal [Where is the bottle]?

John: Tá an buidéal sa póca...sa phóca [The bottle is in the pocket...in the pocket].

7.2.4 TECHNOLOGY USE IN THE CLASSROOM

The teacher used the following technology tools in her Irish-language lessons: a laptop; an interactive whiteboard (IWB); a remote control for the IWB; the textbook's accompanying website; a cursive writing computer application; and IWB games. Technology was not used pedagogically, however, as it was mostly used to deliver content or for games. Even though she had access to three laptops and two desktops, students only engaged with the IWB when called upon to participate in language games or to select answers. Twenty seven percent (n=148) of my questionnaire respondents stated that they used technology regularly in their Irish lessons, a substantial increase compared to 7% of teachers in 2008 (DES, 2008). I suspect, however, that technology is mainly used for presentation of information or for IWB games as respondents indicated this in their comments stating: 'we use our interactive white boards for games, matching, etc.' and 'usually just Bun go Barr [textbook] online to talk about pictures and complete written activities'. This aligns with my classroom observations where the teacher used her IWB to present content and for online learning games and activities. I also noticed that IWB games were mostly delivered through the medium of Irish, but in a different dialect (Ulster) to that of the students (Munster). Some games were in English, however, and the teacher would mute the audio and describe the activity in Irish or translate the English text on the board.

One teacher I interviewed as part of my follow-up interview study felt that IWB games helped students expand their vocabulary, but not with forming sentences or engaging them in conversation:

S'é an fhadhb atá ann, dár liom, leis an teicneolaíocht agus na cluichí seo, go bhfuil sé ag tabhairt foclóir dóibh ach níl sé ag cur brú orthu an struchtúr nó an abairt a thabhairt ar ais duit as Gaeilge...ag deireadh an lae tá tú ag iarraidh iad a bheith in ann caint. Sin é. [The problem with technology and these games is that it builds students' vocabulary, but they do not have to put the words into sentences...at the end of the day you just want them to be able to speak in Irish. That's all.] (Henry, 2015).

I felt these IWB games held little pedagogical value. In one Irish-language game I witnessed, for example, the teacher read out furniture items and students had to tell her in which room to place them:

Teacher: Leaba (bed).
Students: Seomra codlata (bedroom).
Teacher: Bord (table).
Students: Cistin (kitchen).
Teacher: Folcadán (bath).
Students: Seomra folctha (bathroom).

The teacher could have expanded upon this activity by using complete sentences, for example, 'cuir an leaba sa seomra codlata' (put the bed in the bedroom). The teacher also called on students to drag furniture items to the appropriate rooms while everyone remained silent, including the teacher. Students enjoyed these activities, however. Three weeks into my observation period, we asked students to tell us what they liked doing the most in Irish class and 96% (n=25) of them mentioned IWB games (Feedback Session 1).

7.3 INNOVATIVE LANGUAGE LEARNING ACTIVITIES

The students spent six weeks creating digital stories based on curricular themes depicted in three chapters of their Irish textbook. As aforementioned in chapter 6, the teacher engaged in pre-communicative and post-communicative learning activities to introduce and summarise learning content. Together we implemented the innovative communicative storytelling phase, where students naturally and holistically integrated all four language skills into their digital stories. For this study, I operationally define a successful digital story as one that is constructed upon a solid storyline, encompassing six scenes that are logically linked. It incorporates voice, text and still images, as well as appropriate backgrounds, character images and audio effects to reveal context and enhance meaning. The digital storytelling process involved students first creating their storyboards individually and then recreating them digitally together in groups.

7.3.1 INNOVATIVE IRISH LESSON STRUCTURE

I designed our Irish-language lessons and the teacher reviewed and approved all lesson plans and learning materials before each lesson. Innovative Irish lessons were delivered each Wednesday morning over a two-week block and involved a discussion of the learning objectives and outcomes, a presentation of the digital story, an interactive quiz on the story content and a word cloud displaying relevant vocabulary for story creation, see Appendix C for more information. All lesson plans

aligned with curricular themes and textbook learning objectives, and highlighted key content areas in terms of grammatical constructs and vocabulary/phrases. Each lesson was conducted through the medium of Irish and English translations were given when requested. On alternate weeks, we either demonstrated a storyboard activity or a particular technology feature, incorporating and building upon student queries, ideas and input.

In week one, students completed a storyboard template individually and on the second week they created their digital stories collaboratively in groups of five. Each student created one page of the digital story and had to include text, images and a voice recording. Students were discouraged from simply replicating the story on the board, but encouraged to construct and negotiate meaning as they collaboratively created their digital stories. They discussed translations, spellings, syntax and design, as well as troubleshooting any technical issues that arose during the digital recreation process. The teacher and I worked closely with the groups, scaffolding their learning and providing just-in-time-instruction and prompting when required. At the end of each two-week period, the teacher presented the digital stories to the class. Students also shared their stories with each other on the Little Bird Tales (LBT) application. The diagram below illustrates our approach.

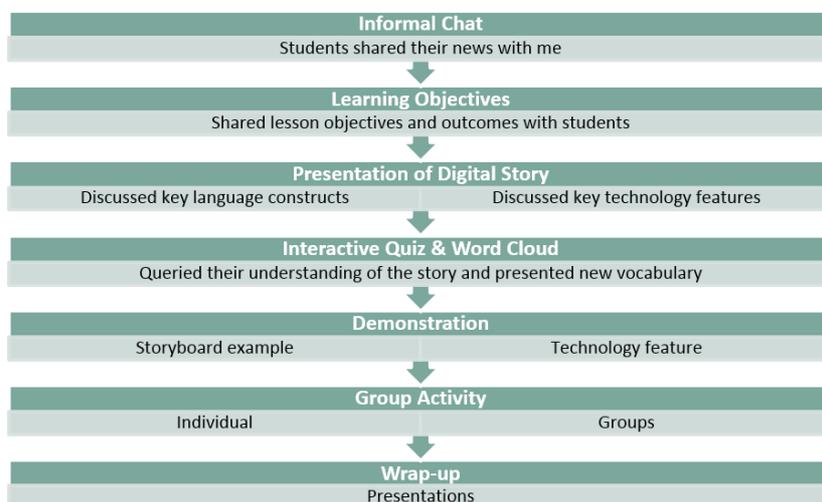


Figure 7.2: Innovative Irish Lesson Structure

7.3.2 THE DIGITAL STORYTELLING PROCESS

Ackermann (2001) describes the process of storytelling as students first acquiring the ‘ability to sequence story elements in a linear coherent manner’ and then playing around with story elements within ‘elaboration spaces...combining and recombining them until they form meaningful configurations’ (p. 35). In this study, I feel that the storyboard template enables this sequencing of story elements and that the technology becomes the elaboration space, where students can link ‘voice to word’ (Ackermann, 2001, p. 31). In this way, technology facilitates pronunciation and extended production in the target language (Edelenbos et al., 2006). Voice recordings also enable students to develop ‘techniques of self-monitoring and self-assessment’ (Little, 1991, p. 12) facilitating deeper learning and opportunities for reflection as they review and edit their work until ‘polished’ (Collins, 2009, p. 58).

Digital storytelling activities in the classroom proved to be engaging and fun, and generated a buzz and energy amongst students. Robin (2006) notes that it can take students ‘several attempts at creating digital stories before they demonstrate technological proficiency’ and that they need time to adapt to new instructional methods as they engage in digital storytelling activities (p. 7). This was certainly the case at the outset but students quickly became adept in all aspects of story creation. They participated in three storyboard sessions and three technology sessions in the classroom during this iteration and two introductory lessons in both the computer room and the classroom. Students created 74 storyboards and 72 digital stories in total. They created 17 Irish stories in class and 55 outside of class. Only 9% (n=5) of those created at home were in Irish, however.

7.3.2.1 INTRODUCING DIGITAL STORYTELLING TO STUDENTS

Students first participated in a one-hour technology session in the computer room where I played my digital story about Oíche Shamhna (Halloween). I introduced the various design and search tools that they would need in order to create their images and audio segments for their digital stories. The learning objectives for this session included:

- Download three images from the online image repository My Cute Graphics (MCG);
- Edit or design one image using the image editing application ABCyapaint; and

- Create and save an audio recording from Vocaroo.

Through a series of short instructional bursts, I showed them how to add characters, objects, shapes and text to their designs, and I introduced them to the concept of perspective through image resizing and placement. As I demonstrated the various technology tools, I incorporated the story element into my instructional approach and recited a story as I drew various images on the screen. I delivered my presentation through Irish and questioned them wherever possible. In one instance, I asked students to name the drawing tools on the toolbar in Irish as I worked through them and they returned words such as 'peann luaidhe' (pencil), 'marcóir' (marker) and 'scaub' (brush). Students offered suggestions as to what I should draw such as 'puimcín' (pumpkin) and how I should draw it: 'úsáid ciorcal' (use the circle) and 'oráiste' (orange). Students were given time to explore and play with the applications while completing their three technical tasks. They moved around as they became interested in each other's work questioning, showing and learning from one another. Three students spontaneously wrote short stories in Irish using the text tool in the ABCyapaint application.

In the classroom afterwards, they received further instruction on how to complete a storyboard and were given more time to tinker with their new digital tools. The teacher first demonstrated the storyboard process on the board by completing each of the six frames, drawing a series of pictures and writing the corresponding text beneath each one. She completed this activity in Irish and prompted students into helping her write her story about Oíche Shamhna (Halloween). This was their first time writing stories in Irish. Their only experience until then had been activities involving filling in blanks and writing short answers to questions around textbook stories. The following dialogue illustrates their surprise when they hear that they will be writing their own stories. During this exchange, students helped the teacher write her story and one student even corrected another:

Fionn: Do we write it in English?

Teacher: No, as Gaeilge [No, in Irish] [*Students gasp. Their first time engaging in a freewriting activity*].

Voices: What!

Teacher: Úsáid Bun go Barr ([Use your Irish textbook] to help you write your stories, especially chapter six, Oíche Shamhna [Halloween]).

Teacher: Cad a raghaidh isteach sa scéal? [What will go into the story?]

John: Oíche Shamhna a bhí ann [It was Halloween].

Teacher: Is mise an cailleach [sic] ghránna! [I am the ugly witch!]. Where was she?

Cá raibh sí?

Naoise: Bhí sé 'on the beach' [He was on the beach] [*Somebody shouts out sí – the correct personal pronoun!*]

Teacher: Ar an trá, b'fhéidir, bí ag smaoineamh faoi Oíche Shamhna, Naoise [On the beach, maybe, think about Halloween, Naoise].

Peter: Ó theach go teach [from house to house].

Teacher: Chuaigh an chailleach ó theach go teach [The witch went from house to house].

Susan: Can I say one for the second one?

Teacher: S'ea [Yes].

Susan: Chuaigh an cailleach sa spéir [The witch went in the sky].

Teacher: Chuaigh an cailleach go hard sa spéir, go hiontach Susan! [The witch went high in the sky, well done Susan!]

The teacher then arranged students into groups of five and we gave each group a laptop. We encouraged them to work together and help each other out as they played with the various digital tools. We reconvened the following day for Irish class. I introduced the digital story application, Little Bird Tales, through short instructional bursts incorporating our story element. I showed them how to add text and audio, and how to create images using its sketchpad feature. I also pointed out other important features such as the preview and save tools. I then showed students how to access and log in to⁴³ the LBT website. The teacher placed the students into groups of five where each group had to create a digital story using images, text and a voice recording. The ensuing six weeks saw students engage in storyboard and digital recreation activities as part of their Irish-language lessons. I discuss this approach in the following sections.

7.3.2.2 THE STORYBOARD PHASE

Storyboards are 'simple graphic organizers' (Bogard & McMackin, 2012, p. 319) similar to a comic strip. They guided students as they planned and composed their stories (Bogard & McMackin, 2012; Mullen & Wedwick, 2008). I included six sections in our storyboard template with specific areas for illustrations and corresponding text. The students understood that each section would become a scene in their digital stories, where their written words would form the narration and text and their artwork would guide their digital designs. Students were expected to write

⁴³ I created a teacher account and individual student accounts in advance of this class.

stories around curricular content demonstrating correct semantic, morphological and syntactical use of the Irish language.

The following illustration is a storyboard completed by one student and is based on chapter six of their textbook, *Oíche Shamhna* (Halloween). It aligns with the curricular theme *Ócáidí Speisialta* (Special Occasions). It demonstrates the writing process in terms of the student's first draft, the scaffolded learning process resulting in the student correcting and rewriting segments of his story, and finally the teacher reviewing his story before moving onto the next stage in the digital storytelling activity. In the second frame, for example, the student includes the verbal noun 'ag dul' (going). He originally wrote: 'Bhí an púca ó theach go teach' [the ghost from house to house] and later through scaffolded instruction, he included the verbal noun: 'Bhí an púca *ag dul* ó theach go teach' [the ghost *was going* from house to house]. In the third frame, he crossed out an incorrect spelling 'codlat' (bedroom) and spelled it correctly 'codlata'. He changed his choice of verb in the fourth frame from 'Bhí' (was) to 'Dúirt' (said) and included the definite article 'an' (the). In the final frame, he rewrote 'bhí an derág' (the end was) as 'an deireadh' (the end). These were modifications that the student made to his story while under our guidance. Each student completed a storyboard and the teacher corrected the storyboards in preparation for the digital recreation phase. Her checkmarks are visible in the diagram below.



Figure 7.3: Student-Completed Storyboard

We considered using a dedicated storyboard technology tool such as Storyboarder⁴⁴ in the writing sessions, and even though prominent educationalists such as Papert (1993b) extol the virtues of using technologies such as word processors for writing and editing drafts of text, we decided that students should write their storyboards by hand as cursive writing was one of the skills they were expected to develop in third class. Furthermore, sustained use of technology over long periods is usually less effective at improving attainment compared to regular and frequent use (Higgins et al., 2012) and we therefore decided to focus on a paper-based approach in this phase before moving onto the digital recreation phase.

7.3.2.3 THE DIGITAL RECREATION PHASE

Groups of students recreated their penned stories in digital format using LBT. Groups generally composed of five students depending on absences on a given day. The teacher configured the groups according to mixed ability. LBT is a simple application with a voice-recording feature and an art studio. Students learned to use it intuitively in a very short space of time. The following illustration is an example of LBT's interface as Dáithí and his group worked on their digital story⁴⁵ *Oíche Shamhna* (Halloween).



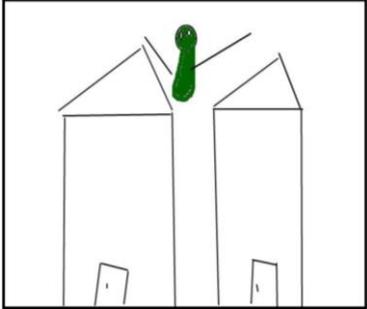
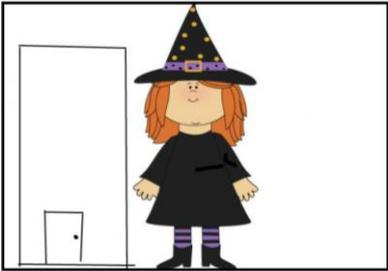
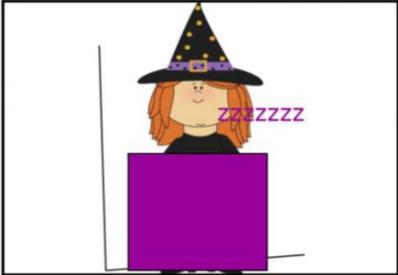
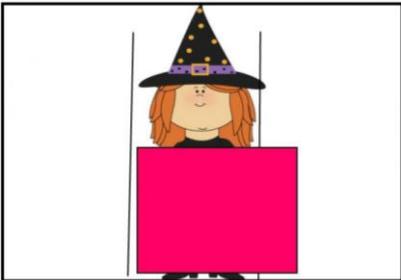
Figure 7.4: Dáithí's Group's Digital Story in LBT

⁴⁴ <https://wonderunit.com/storyboarder/>

⁴⁵ https://littlebirdtales.com/tales/view/story_id/453817/

The following diagram is an example of another group's digital story⁴⁶, based on the same theme *Oíche Shamhna* (Halloween), and is broken down into its various scenes in tabular format.

Table 7.1: Larry's Group's Digital Story in Tabular Format

<p style="text-align: center;">An Chailleach By Rachel's Group</p>  <p style="text-align: center;">Oíche shamhna a bhí ann. Is mise an chailleach. Is maith liom míseáin.</p>	 <p style="text-align: center;">Bhailigh an chailleach míseáin agus cnoonnaigua arigead</p>
 <p style="text-align: center;">chuaigh an chailleach o theach go teach. Dith an chailleach míseáin.</p>	 <p style="text-align: center;">chuaigh an chailleach abhaile</p>
 <p style="text-align: center;">Thit sí ina codladh</p>	 <p style="text-align: center;">Féach... Tá an chailleach ina chodladh go sámh</p>

⁴⁶ https://littlebirdtales.com/tales/view/story_id/467793/

7.4 OBSERVATIONS FROM ITERATION ONE

I discuss my main observations from this design cycle under the following themes: language, learning activity, technology and engagement. These themes concern the design conjectures and requirements pertaining to TALES that I outlined in the previous chapter. To summarise, my conjectures include fostering language-in-use in a communicative, meaningful way; the pedagogical application of technology using digital storytelling; and the promotion of collaborative learning through scaffolded instruction and peer learning.

7.4.1 LANGUAGE IN USE

We relied heavily upon translation as part of our instructional approach. Students enjoyed writing their own stories and their comprehension of the Irish language improved as the iteration progressed. They rarely spoke to us in Irish, however, and never to one another. They also seemed slightly apprehensive recording their voices at the beginning.

7.4.1.1 TRANSLATION

Even though students regularly asked for Irish translations as they composed their stories, the teacher and I frequently translated from Irish to English. I noticed that the teacher naturally translated all her instruction to English: 'Tá an abairt sin ana fhada...it's very long'; 'Bí cúramach le 'sa agus h'...Be careful with 'sa agus h'; 'fág an bearna [sic] muna bhfuil a fhios agat...leave it blank if you don't know it'; 'fág an spás ann...leave a space there'; and 'sábháil é...save it'. The following exchange between the teacher and students is revealing. Here she used a substantial amount of English as she scaffolded their learning during our final storyboard session⁴⁷. Interestingly, the teacher prompted students for the most part, but she provided them with information on several occasions indicating that she was still adapting to our new instructional approach:

⁴⁷ We decided to pair students in their final storyboard session.

Teacher: OK, Conall. Bhí Aoife sa pháirc [Aoife was at the park]. What was she doing? [*reading their story*]

Conall: Bhí Aoife sa pháirc.

Teacher: Agus cad a bhí á dhéanamh aici? [What was she doing?] Bhí sí...[she was].

Conall: Bhí sí ag siúl agus...[She was walking and].

Teacher: She was walking. Bhí sí ag siúl, she was walking. You can start it there. Bhí...sí...Í for a girl...siúl...ana mhaith [She was walking, very good].

Conall: Did I do it wrong. Where's my rubber?

Teacher: No, you're right.

Teacher: Cad a tharla? What happened? Bhí Aoife sa pháirc. Bhí sí ag siúl. Aoife was in the park. She was walking.

Annie: Maybe she fell and hurt her knee?

Teacher: She fell and hurt her knee. How do you say 'she fell'? Thit...[Fell].

Conall: ...sé...[he].

Teacher: ...sí...[her] agus [and] 'hurt her knee'?

Teacher: Ghortaigh mé mo ghlúin. I hurt my knee. How would you say she hurt her knee? Ghortaigh...[Hurt].

Annie: ...sí...

Teacher: Ghortaigh sí a glúin [She hurt her knee].

Teacher: Well, first you have to write...

Annie: Thit sí ar an talamh [She fell on the ground].

Teacher: Thit Aoife ar an talamh. Ana mhaith, Annie. You can use the Brioscaí chapter to help with the spelling.

...

Conall: Now, we're trying to end it.

Teacher: Ghortaigh sí a glúin, b'fhéidir go bhfuil duine eile ann? Is there someone else? Duine eile? [Somebody else?].

Annie: Maybe her friend came along and helped her.

Teacher: An bhfuil tú...[Are you].

Conall: An bhfuil tú ceart go leor. [Are you ok].

Teacher: An bhfuil tú ceart go leor, arsa Colm. Go maith!

Upon playback of my video observation files, I noticed that I too translated to English without the students asking me to do so. Whenever I played my Irish stories, for example, I automatically translated each sentence into English. In the following dialogue, I use a lot of English in my explanation around 'sínte fada' (accent marks) and do not prompt students despite the opportunity arising:

Rose: Bhí Aoife ag siúl. Bhí sí ag siúl lena madra [Aoife was walking. She was walking with her dog].

[*reading their story*]

Conall: How do you spell 'lena'?

Rose: Lena is L E N A.

Rose: Lena madra. How do you spell 'madra'?

Conall: M A D R A. How do you spell 'úrlár'? U R L...what else?

Rose: Á R...do you know that úrlár means 'floor'? Is there an 'úrlár' in the 'páirc'?

Annie: Sort of.
Rose: What do you call it? What's the ground outside called?
Annie: Talamh [ground].
Conall: So, I'll write down 'Talamh'?
Rose: Conas a litríonn tú 'Talamh'?
Conall: T A L A M H.
Rose: S'ea! Go hiontach, Conall [Yes! Very good].
Conall: Is there a fada [an accent] on any of them?
Rose: What do you think?
Conall: No.
Rose: If you have a fada it changes its sound. Look at 'Féar' [grass] and 'Fear' [man] [*I write it out for them*]. What's the difference?
Conall and Annie: The fada.
Rose: Yes, if you didn't have this, you'd have the green man instead of the green grass!

7.4.1.2 STORY WRITING

Students enjoyed this activity. When we asked them how they felt about writing their own stories in our first feedback session in October, every student responded positively saying it was a fun activity. One student wrote: 'I love to write my own stories. I have great ideas to do. I love to draw the characters' and another shared: 'I like writing, it's creative and fun'. Several students appreciated the opportunity to express themselves: 'I can express myself' and 'I like making up characters and expressing them in the story'. Others mentioned using their imagination: 'I can use my imagination', 'it keeps me imagining' and 'it makes me imaginative'. One particular student mentioned the quality of the finished product: 'After you write the story, you can see how good it is and it's normally really good' and another enjoyed sharing his stories with others: 'I like that the class gets to see it'.

In our following feedback session in November, we asked them if it was getting easier to write their own stories. Ninety six percent (n=27) of our students felt it was, while one student wrote: 'not really'. Students mentioned how they found writing their own stories to be interesting, creative and fun, with one student saying: 'Yes, because it is more interesting than the book and you get happy when you do it'. Several students mentioned learning more Irish than usual: 'It is easier to do sentences and all that because you learn more Irish' and 'It is helping cause I'm learning how to say sentences in Irish! It is fun too' and 'Yes, I love Irish now!'. One particular student compared our innovative approach to the more traditional approach they were used to, saying: 'I think it's way more fun where you're doing this compared to the book. Because in the book we're just kind of writing things

down'. The following exchange during this feedback session between one of the students and the teacher is enlightening, where one student compares both approaches:

George: Am, remember the first week when Rose wasn't here and we just done normal Irish.

Teacher: Normal Irish, yeah.

George: Then the second week she was here and we still did normal Irish. No offence, whoever invented Irish, or to ye two, but I thought that was boring.

Teacher: The normal Irish, the book. So, this is more exciting than the book. OK. That's a fair enough point.

George: Yeah, it's more fun than the book.

Rose: Can I say something? Do you know that you're doing the same thing as the book all the time?

Peter: What?!

Teacher: We're doing the same chapters. We're still reading the same stories and learning new things from each chapter.

Áine: It's much funner doing it like this.

7.4.1.3 Language Learning

Students did not speak any Irish to each other as they worked together in groups. They understood us when we spoke to them in Irish but they mostly replied to us in English. During our first storyboard session, for example, even though this student understood my question, he still replied to me in English:

Cian: The girl is on the ground.

Rose: Ar thit sí? [Did she fall?].

Cian: Yeah. She fell.

In our third technology session, students were still replying to us in English. I felt that their comprehension of Irish was improving, however. In the following exchange, John understood the teacher and responded appropriately:

Teacher: Bhí na páistí ag súgradh sa pháirc. Bhí Eimear ag scátáil. Ana mhaith! B'fhéidir nach mbeidh pictiúr ann le scátaí. Faigh pictiúr den chailín agus dáthaigh isteach na scátaí [The children were playing in the park. Eimear was skating. Very good! You might not find a picture of a girl skating. Find a picture of a girl and colour in the skates].

John: We already have one that is skating.

Students seemed apprehensive when it came to recording their voices. During our second feedback session, we asked them if they liked hearing their own voices in their stories. Eighty five percent (n=23) of students viewed it as a positive experience saying it was 'fun' and 'cool' to hear themselves speaking in Irish, with one particular student stating: 'Yes, it's nice to hear your voice in Irish'. Four students answered negatively, however, saying 'no' or 'not really', with one student writing: 'Sometimes, I think I sound different'. Furthermore, the technology surrounding this activity was troublesome at times causing problems for students. This diminished with time as they became used to troubleshooting this particular audio issue.

7.4.2 LEARNING ACTIVITY

The teacher was slow to move from traditional instruction but as the iteration progressed she instructed less and engaged more in scaffolding approaches. It also took time for students to adapt to this new way of learning, where they were now collaborating and learning from each other. Students' technical abilities were strong but some struggled with basic activities at the beginning. The technology tool proved cumbersome in that students spent too much time on the design aspect of the activity, leaving less time for their writing.

7.4.2.1 TRADITIONAL INSTRUCTIONAL APPROACH

The teacher mostly employed traditional approaches in her teaching. She appeared to be doing a lot of the work for students during our technology sessions, in particular, and not explaining her actions. During our second technology session, for example, Dáithí downloaded and saved an image of a ghost from MCG to the group's laptop three times but was unable to locate his file. The teacher noticed this and brought them back into LBT. She found and imported the image for them and then added the title of their story. She then saved the page and placed the headphones on Dáithí to record his voice. In another scenario, she raced through a quiz I created for our final digital storytelling activity. She called students up to the IWB one at a time to select the correct answer. It became a wasted activity in the end as she did not ask students to respond orally and she did not expand upon the answers they selected. On another occasion, during our first storyboard session, students spontaneously looked up a dictionary for an Irish spelling and this conflicted with her traditional approach:

Peter and Larry whisper to one another as they look up a word in a dictionary. Peter tells Larry to turn to page 37. Larry navigates to that page. The teacher reprimands Larry for using a dictionary. She takes it off him and tells him the words are in the book. She asks: 'what are you looking for?' and he says 'glaigh' [call] (Rose, Week 2).

7.4.2.2 INSTRUCTION BURSTS

We employed short bursts of instruction during our innovative activities calling upon students for their input and questions. In our first storyboard session, for example, I played my digital story highlighting the verbal noun 'Ina Suí/Ina Shuí, Ina Sheasamh/Ina Seasamh' [Sitting, Standing]. Students offered examples of how to use this construct and explained the rule to me and to each other, deepening their understanding in the process. At one stage, however, the teacher intervened and provided one student with the answer, indicating her hesitancy in adapting to this new way of teaching:

Rose: Tá an múinteoir ag glaoch an rolla [The teacher is calling the roll]. Tá sí ina suí [She is sitting].
Cian: For a boy, it would be 'tá sé ina shuí' [he is sitting].
Vladimir: We learned it in school yesterday.
Peter: What is the rule?
Rose: The rule is, if it's a boy, Cian said it there, Cian, cad é an rial arís? What's the rule?
Cian: If it's a boy, then it's 'tá sé ina shuí'.
Rose: If it's a boy standing up, how do you say it?
Peter: Tá sé seasamh [He stands].
Rose: Tá sé...John? [He is...John?].
John: Ina sheasamh [standing].
Clara: When you say 'ina luí' [sleeping] then it doesn't change.
Rose: No, it doesn't change. That's a very good point! It doesn't change because you can't put a 'h' in a word that begins with 'l'.
George: L never changes.
Rose: L never changes when it's a boy or a girl. What about this one? She is sleeping. Now somebody who hasn't answered yet. Jack?
Jack: Tá sí ina codladh [She is sleeping].
Rose: Go hiontach [Wonderful]! Do you have one, Larry?
Fionn: I know what he wants to say.
Larry: I forgot.
Vladimir: He's trying to say 'Dhúisigh sé' [He woke up].
Teacher: Ina dhúiseacht agus ina dúiseacht [Sleeping].
Rose: Yes, Vladimir, that's another one, he is awake? Larry, he is awake?
Larry: Dhúisigh sé...
Rose: Or what about 'tá sé' [He is]?
Larry: Tá sé...ina...dhúiseacht [He is sleeping].
Rose: Maith thú [Well done], Larry! So, will we try one more? She is awake?

Cian: Tá sí ina dúiseacht [She is awake].

Rose: Tá sí ina dúiseacht. You really do know this rule, don't you! Ana-mhaith.

7.4.2.3 SCAFFOLDING

We adopted a scaffolding approach to learning during our innovative activities. In the second storyboard session, for example, Fionn asked for some help translating the sentence 'she went to bed'. I helped him through it by breaking the sentence down for him and he succeeded in building the translation himself. I notice how I depend on translation during this exchange:

Rose: Cuir Gaeilge [Put this into Irish] ar 'she went'.

Fionn: I don't know. Am, téi...téann sí [she goes].

Rose: Nach mór [nearly], that means 'she goes'. You want the Irish for 'she went'. It happened yesterday.

Fionn: Oh I know, 'chuaigh sí' [she went].

Rose: S'ea! Cad í an Ghaeilge ar 'bed' [Yes! What is the Irish for bed]?

Fionn: I know that, 'leaba' [bed]!

Rose: Put it all together now. Cuir le chéile é.

Fionn: Chuaigh sí leaba, chuaigh sí sa leaba [she went to bed].

Rose: Chuaigh sí isteach sa leaba [She went into bed]. That's one way to say it. She went to bed. What about 'she went to sleep'? Is that what you mean?

Fionn: Yeah!

Rose: Chuaigh sí...

Fionn: Codladh [sleep].

Rose: S'ea. Chuaigh sí a chodladh [Yes. She went to bed]!

Fionn: Chuaigh sí a chodladh! Yay, I got it!!

7.4.2.4 STUDENT COLLABORATION

While students worked individually on their stories, they shared their progress and problems with one another and read their Irish stories aloud to each other. Their voices became more dominant during classroom activities as they discussed, questioned and explored language and technical content with us and with other students. Surrounding noise from other groups interfered with audio recordings, however. The process of digital recreation proved difficult at times with groups of five students working on one computer. During our second technology session, for example, students went off-task several times. The teacher and I had to consistently step in to bring their focus back to their work as my field notes reveal:

Cian has taken Ruth's mouse so that he can add to her drawing. I return and ask Ruth to take the mouse back. Dáithí calls Cian 'to do this' [his page]. He gladly takes the opportunity. It seems that Dáithí has lost interest. Cian works alone while the other four fool around. I hear the teacher ask Conall to return to his seat. Susan and Ruth are very distracted and chat about a TV programme. Conall is nowhere to be seen!

In our third technology session, an over-dominant member affected group dynamics. Cian corrected Lisa's spelling and her punctuation when she wanted to do it herself.

Cian: Full stop! Full stop there! You did not spell 'bhfuil' properly!
Lisa: Try and get out of the way, we just want to make the best!
Cian: I'm trying to do that. Press that! Press that!
Lisa: Stop, Cian!
Cian: Full stop! Full stop! There's an 'f' in 'bhfuil'.
Lisa: Let me do it myself! Stop!

Further friction occurred between Cian and Lisa later in the activity as he directed everyone in their work.

Cian: There's no results on that [*searching for a particular image online*].
Róise: Wait, you won't know until I press that.
Cian: There's no results on that.
Róise: Well, it's worth a try. Isn't it?
Cian: Peter tried it, no result. Ohhh!
Róise: He doesn't know, Cian.
Cian: Yeah, but I asked Peter and he tried. Girl Playing. Girl Playing [*shouting*].
Lisa: Ok, just stop!
Cian: Girl Rollerblading. Girl Rollerblading [*shouting*].
Lisa: Cian, you're not the boss of her.
Cian: I'm trying to give her some advice so you should go away.
Lisa: Would you stop telling her what to do, Cian.
Cian: Next page, next page!
Rose: Now, cé hé an chéad duine eile [Who is the next person]?
Cian: Séamus.
Rose: Séamus, isteach leat [in you go].
Lisa: You going to tell him what to do?
Rose: Gabh mo leithscéal [excuse me], Lisa?
Cian: Séamus, you're doing the picture.
Rose: Só, Séamus, an pictiúr, an ea [the picture, is it]?
Séamus: Yeah.
Cian: No, I'm giving him advice. You go away. It's called group work.
Lisa: Yeah, you're not really doing group work.
Cian: Yes, we are. Me and Séamus are doing it.
Rose: Caithfidh sibh go léir a bheith ag cabhrú lena chéile [you all need to help each other]?
Séamus: Make a new folder, new folder.

Cian: I already made a folder. It's here.
Lisa: You never saved your picture. I know how to do it.
Cian: I saved it. In The Park. I just found it. It's here. It's coming.

7.4.2.5 PEER LEARNING

Students helped each other with their spellings, translations and technology tools during this iteration. I include several vignettes below illustrating how students coached and learned from one another as they created their digital stories. In the following scenario, for example, students helped each other with their spellings. During our final storyboard session, Cian attempted to spell a word and Naoise not only spelled it for him but put it into a sentence for him. He also included the 'séimhiú':

Cian: How do you spell 'pleidhcíocht' [messing]? P L E I D H...?
Naoise: Ag pleidhcíocht...C Í O C H T. Ó! Stop den phleidhchíocht! [Oh! Stop messing!].

In the following dialogue, students helped each other with their spellings while creating their digital story:

Cian: Remember your capitals. Capital B. Bhí na páistí... [The children were].
Lisa: Bhí na...
Cian: ...P Á I S T Í... S T Í.
Lisa: Bhí na páistí...
Cian: Ag...
Lisa: Ag...
Cian: Ag súgradh [playing]...G R A D H...
Cian:...sa pháirc [at the park]...bhí...B H Í...Eimear...ag scátáil...ag scátáil...S C Á T Á I L [Eimear was skating].
Lisa: S C Á...
Cian: T Á I L...T Á I L.
Lisa: So, bhí sí ag scátáil [she was skating].

In another exchange, one student explained the story structure to another:

Cian: Go back on to the tale, you have to write 'an deireadh' [the end].
Lisa: What?
Cian: An deireadh. I know how to spell it.
Lisa: Why?
Cian: It's the thing to show that you've finished your story, it means 'the end'.

During our third technology session, students discuss the best tools to use in order to perform a certain action:

Cian: I'll do this one. I'll colour it when I go to Little Bird Tales.

Lisa: That will take ages.
Séamus: You can get a big bucket and just throw it over it [*referring to fill tool in LBT*].
Cian: I'm doing the bucket.
Lisa: That's in ABCya Paint.
Cian: No, you can do it in here too [*referring to LBT*].

7.4.3 TECHNOLOGY

Some students struggled with basic technology procedures at the beginning and designing story elements proved time-consuming.

7.4.3.1 DIGITAL SKILLS

We noticed that students had difficulty with basic computer activity such as right-clicking a mouse to display the contextual menu, entering URLs⁴⁸ into the web browser address bar and retrieving downloaded files from their computers. As the teacher noted:

Like one of the kids today said to me 'I don't really do computers, I don't have one at home', and wasn't able to type into the search bar, wasn't able to go online, I had to do all that for him. That can catch some people sometimes...some are very confident and competent using IT and others are not as competent (Interview 1).

This conflicted with findings from my national teacher questionnaire, where many of the respondents believed their students to be digital natives. In a follow-up interview with one of my respondents, one teacher stated:

They are digital natives anyway. So this is their world, they are so comfortable with it and used to it (Mary, 2015).

We found that many of them had difficulty in logging into LBT as both the username and password for their accounts started with a capital letter, which was the student's first name. Technical problems surfaced in every session, those pertaining to voice

⁴⁸ Uniform Resource Locator, the address of a world wide web page.

recording in particular. Towards the end of this iteration, however, students were attempting to troubleshoot their own technical problems and relied less upon us to resolve them such as this student reminding the rest of her group to turn up the sound during playback:

Clara: I can't hear it.

Peter: Get Rose.

Clara: Did we save it?

Rita: Make sure the sound is on, it's down in the bottom.

Students' technology skills improved and their confidence grew as this iteration progressed:

Annie worked hard. Even though Conall distracted her, she still created a fantastic picture. She was so nervous creating her first graphic five weeks ago when she first started working with LBT. It took her a long time just to draw a square. She's much more confident today (Rose, Week 6).

As students worked on the teacher's computer, their activity displayed on the IWB. This acted as a stimulus providing other students with ideas and as an opportunity for students to share their work. In addition, whenever we showed a group how to complete a certain task such as adding text or narration, other students would observe this activity on the board. It proved to be another way of teaching and learning.

7.4.3.2 TECHNOLOGY TOOL

Design aspects of the story seemed to detract from its content. The process of image sourcing and design proved time-consuming for students. While searching for images in English, they often appeared unsure of their spellings. Their focus on aesthetics took away from story composition as they spent too much time drawing, colouring, designing and searching for images as my field notes reveal:

They have spent a lot of time, close to 25 minutes, creating and finding images and editing them. It's taking up all their time, it's causing the most aggravation amongst them (Rose, Week 10).

The classroom teacher noticed this too stating:

I think Little Bird Tales is a great app, it's easy to use. The kids took to it really easily but the lack of images and having to find and edit images was too time-consuming...It took time away from the actual writing, and even from the learning, even from the experience of doing a digital story, they got really focused on the image editing and you know they lost focus on the learning (Interview 2).

7.4.4 ENGAGEMENT

Students enjoyed creating their digital stories and often lost track of time. They did not view them as Irish lessons, even though they were listening to Irish, writing in Irish and recording their narrations in Irish:

Seosamh: Will we be doing this every Wednesday?
Rose: Beidh [You will]!
Seosamh: Yes, no Irish on Wednesdays! [*Punching the air*]

Students were never asked to include closing credits at the end of their stories, but many of them did, indicating ownership of learning and pride in their work. They were quiet and slow to react when the teacher presented their digital stories to the class, however. In our second feedback session, we asked students to give us one word that would describe how they felt about these activities. Students returned positive words such as *sásta* (happy), fun, brilliant, cool, interesting, amazing and exciting. The teacher also received some spontaneous parental feedback towards the end of this iteration:

I had Róise's mom up to me today to pass on to you how much she is enjoying our classes and how much she loves doing it at home too! Good to hear! (Email correspondence, 08/10/2014).

7.4.4.1 DISENGAGEMENT

Upon first introduction, students were attentive and excited by the opportunity to engage with the various technology tools and were eager to get started. Time management was an issue, however, as they became so engaged in their story writing and digital creations that they often lost track of time and rushed towards the end to finish them. We noticed that students' attention started to wane about 80 minutes into our digital recreation sessions, in keeping with what Sandholtz et al. (1994)

described as ‘minor off-task behavior’ (p. 18). We also noticed that more able students completed their storyboards earlier and went off-topic soon after.

I found that many students became distracted during our final technology session and we had to bring their attention back to the learning tasks at hand as my field notes reveal:

I noticed that the majority of the class (15) was distracted today. I felt Fionn was very distracted and Conall was quite bold. I didn't see him working on the computer once. Seosamh worked hard at times, but he messed around with Conall a lot. Aileen surprised me as she was very distracted and Dáithí too. Róise, Lisa and Séamus also inattentive. Séamus was on the periphery, not partaking. After 24 minutes, he finally showed some interest. Peter, Larry, Rita and Alexa seemed less interested too.

7.4.4.2 REENGAGEMENT

Students reengaged with digital storytelling voluntarily outside of school, indicating their positive past experience (O'Brien & Toms, 2008). Their stories were mostly in English, however, and very few students recorded audio at home. During our second storyboard session, I discovered that students were creating stories at home:

George: You know up there, why does it say 'like this tale, get free mp4'? [*referring to image on browser window*]

Rose: Oh, it means that you can buy the audio story... you can buy the stories that you create and the first one is free. But we don't need to do that. And if you create stories at home you can save them as PDF files.

Larry & George: I did!

Rose: Did you create them at home?

Class: Yeah.

Rose: What kind of stories?

Cian: Christmas stories.

Larry: I still have to work on mine.

Rose: So, you have to go back and finish it? Wow! And Séamus?

Séamus: I made a really good one but it got deleted.

Rose: Oh, no! Could you try again? Because Little Bird Tales saves all your artwork. If you delete your page or your story by accident, your artwork stays in your account.

Students: Cool!

Rose: You'll find it in your gallery.

Séamus: Ok.

Clara: I did it in English about my dog Boo.

Rose: Go hálainn (lovely)! I can't wait to see that! Can I look at your stories?

Class: Yeah.
 Rose: And do you think we could play your stories up here some day? [*on the IWB*]
 Class: Yeah!!
 Cian: Can you play mine now!
 Rose: Cad mar gheall ag deireadh an ranga (what about at the end of class)?
 Cian: When we're done?
 Rose: Yeah, nuair a chríochnaíonn an rang Gaeilge (when we finish up our Irish class).
 Clara: I made another one, it was my dad's birthday a few weeks ago and I made him a story.

They created 55 digital stories outside of class. Only 9% (n=5) of these were in Irish, however. Lisa, for example, created eight digital stories outside of class, two of which were in Irish. One of her digital stories⁴⁹ is illustrated below. The first diagram depicts her work in LBT and the second diagram illustrates her pages in tabular format. It incorporates a curricular theme we covered in class called 'Ar Scoil' (At School) and consists of six pages and a voice recording. Her older sister can be heard narrating one of the scenes.



Figure 7.5: Lisa's Story within LBT

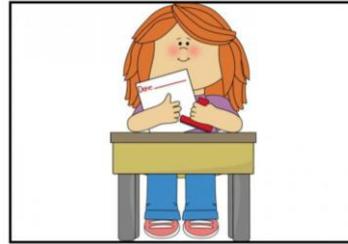
Table 7.2: Lisa's Six-Page Story

⁴⁹ https://littlebirdtales.com/tales/view/story_id/462108/

ar scoil
By Leah Calahan

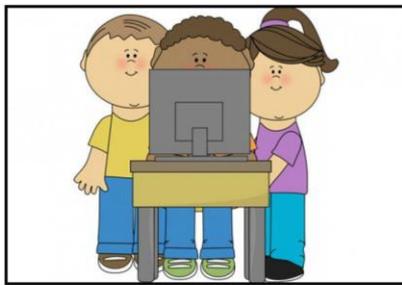


ar scoil
By Leah Calahan



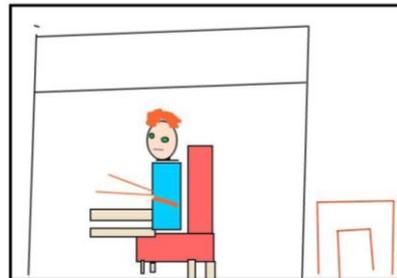
Ta Nasa ag leamh sa leabharlann

ar scoil
By Leah Calahan



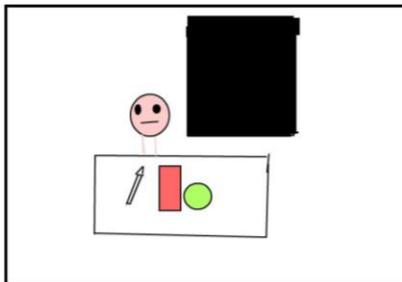
thosaigh Aoife agus Eimear ag obair ar an rionhaire

ar scoil
By Leah Calahan



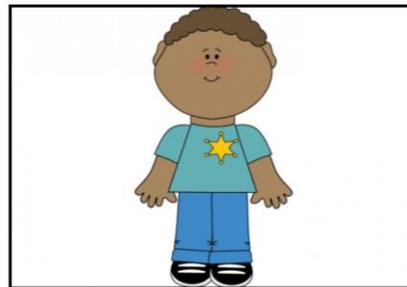
thosaigh Rossa ag luascaidh ar an geathaoir.

ar scoil
By Leah Calahan



Ta An muinteoir ag leamh leabhar

ar scoil
By Leah Calahan



bhi se a tri a chlog, bhi se in am dul abhaile.

7.5 MODIFICATIONS INFORMING ITERATION TWO

Emerging from our analysis of this iteration, the teacher and I executed the following modifications to our design with regard to our use of Irish in the classroom; our storyboard activity; and to technical and collaborative issues that had arisen during this iteration.

7.5.1 LANGUAGE

The teacher and I decided to reduce our reliance on translation as an instructional method and employ a more immersive approach in the classroom. We also decided to introduce English/Irish dictionaries to help students find Irish words and confirm Irish spellings instead of relying on us to translate for them. In addition, we agreed to be more consistent in reminding students to use the Irish words that they already knew and to search for images using graphical categories on the MCG clipart website as opposed to using English text. We also decided that students would present their own digital stories to the class.

7.5.2 STORYBOARD ACTIVITY

We decided to reduce the storyboard template from six scenes to four so students could focus more on story writing and not rush the process, especially towards the end in trying to finish them. In addition, we asked them to leave their artwork until after they had written their stories in order to concentrate on the content. We also changed the storyboard activity from an individual to a dyad activity to encourage greater dialogue and negotiation of meaning amongst students. In our second feedback session, several students requested if they could write Christmas-themed stories and we decided to tie this into the second iteration. Finally, we decided to introduce peer corrections, where dyads of students would swap storyboards and correct each other's stories. This would provide students with an added incentive to ensure their stories were well-written and further deepen their learning.

7.5.3 TECHNICAL ISSUES

I created a folder on each computer desktop to encourage students to download their materials to one central place, making it easier to locate their files when creating their digital stories. We also decided that the next set of student accounts would not include capital letters to enable easier logins and to involve students in troubleshooting technical issues as they arose in class. Students found URLs difficult to input so we encouraged them to search for the applications using the search engine DuckDuckGo. This would also ensure greater success in locating them at home.

Because surrounding noise from neighbouring groups interfered with audio recordings, we purchased headphones with microphones. We also decided that a repository of images, music and sound effects was needed in the next iteration to refocus students' attention on the process of story writing. In our second feedback session, several students asked if they could create stories using video and animation. We kept this in mind when we explored potential technology tools for our second iteration.

7.5.4 COLLABORATIVE ISSUES

There was little teamwork evident during our digital recreation sessions. In order to nurture teamwork and communication skills, we decided to implement the *Ask Three Before Me* rule in the second iteration to develop students' group work skills. Students had to first ask for help from three of their classmates before coming to us (Martinez & Stager, 2013). We designed posters incorporating this rule and hung them on the classroom walls. We also agreed to remind students on a more consistent basis to share their knowledge and skills with one another and to value input from others at all times.

In order to help students with their time management skills and to ensure that every member would have equal access to the computer, we decided to give each group a miniature clock and asked members to rotate every ten minutes. We also acquired four more laptops enabling us to reduce the group size from five to three, bringing our total number of devices to eight laptops and two desktops. We kept the two desktops as floaters for backup when laptops malfunctioned and as extra research stations to search for and edit story resources.

7.6 CONCLUSION

In this chapter I recounted my observations from my first design cycle. I explored the potential of digital storytelling activities in Irish-language learning, tweaking TALES in the process and informing the subsequent second design cycle outlined in the following chapter.

8 CHAPTER EIGHT: DESIGN CYCLE TWO (MAINSTREAM)

8.1 INTRODUCTION

The second design cycle unfolded over a nine-week period between early December 2014 and mid-February 2015. This cycle explored the potential of digital animation as a tool to facilitate Irish-language learning. Issues arising during this cycle were resolved and served to inform our third and final design cycle.

8.2 INNOVATIVE LANGUAGE LEARNING ACTIVITIES

The students created four animated stories based on curricular themes outlined in four chapters of their Irish textbook. As per the previous iteration, the teacher delivered pre-communicative and post-communicative activities to introduce and summarise learning content. Together, we implemented the innovative communicative storytelling activities, where students integrated all four language skills into their animated stories. As before, the animated storytelling process involved a two-step process including storyboarding and digital recreation through animation.

8.2.1 IRISH LESSON STRUCTURE

As per the previous design cycle, each lesson I designed was reviewed by the teacher. All innovative lessons were delivered on a Wednesday morning through the medium of Irish and aligned with curricular themes highlighted in textbook chapters. They involved a discussion of the learning objectives and outcomes, playing our animated story, an interactive quiz and a word cloud displaying relevant vocabulary. Each two-week lesson block followed a similar pattern to design cycle one with some new tweaks. As before, the teacher and I employed short bursts of instruction and ‘talking points’ when we presented our animated story and focused on key language and technology points. Dyads of students completed a storyboard and they created their animated stories collaboratively in groups of three. Each student was responsible for one scene in the animated story and had to include text, a voice recording, images, emotion and motion. The teacher and I worked closely with the groups, scaffolding their learning and providing just-in-time-instruction as required. At the end of each

two-week period, the students presented their stories to the class. The diagram below illustrates our approach.

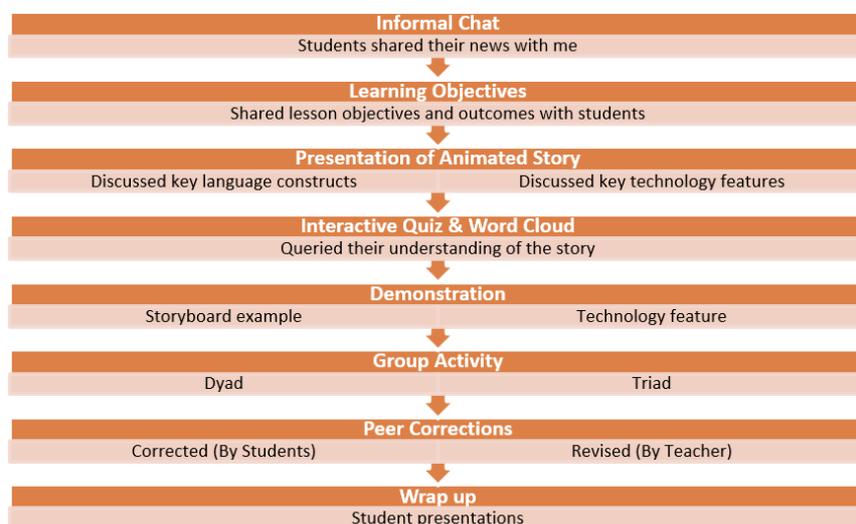


Figure 8.1: Innovative Irish Lesson Structure

8.2.2 THE ANIMATED STORYTELLING PROCESS

For this intervention, I operationally define a successful animated story as one that is constructed upon a solid storyline, encompassing four scenes that are logically linked and where the story combines voice, text, images and motion. Appropriate backgrounds, characters, props, music and audio effects are also included to convey context and enhance meaning. Animated stories reflect curricular content and demonstrate correct semantic, morphological and syntactical use of the language. Students created 213 animated stories in total; 43 of which were created in class in Irish and the remainder (170) were created outside of class. Of those created outside of class, 79% (n=134) were in English, 11% (n=18) were in Irish and 10% (n=17) were in another language or used no language identifiers.

8.2.2.1 INTRODUCING ANIMATED STORYTELLING TO STUDENTS

Students used an online application called Go Animate for Schools⁵⁰ (GA) to create their animated stories. GA is a school-safe, child-friendly online platform for creating animated videos. Student animations cannot be accessed by the public, nor can they be published publicly without the teacher's approval. The login page is unique to each school and is not integrated with social networks. GA also includes an administration section where the teacher can enrol and monitor student activity. The interface is illustrated below.

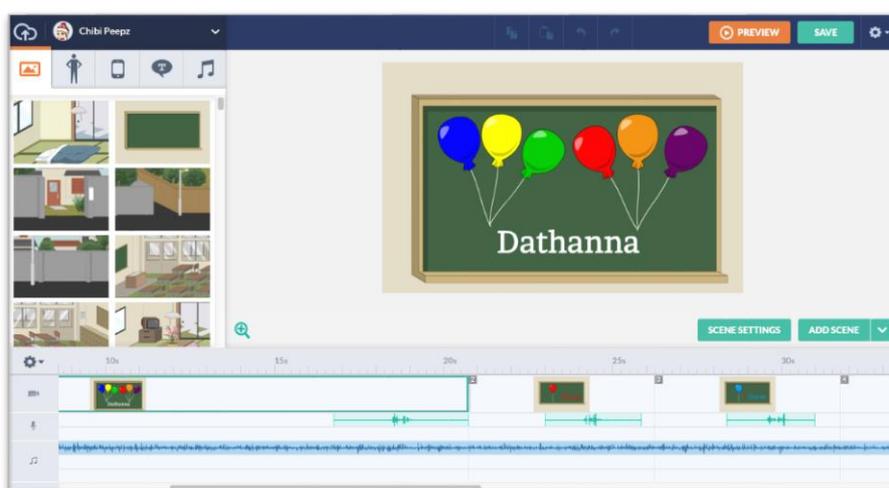


Figure 8.2: Go Animate for Schools' Interface

The students convened in the computer room for a short introductory lesson on GA⁵¹. Prior to this, I had created a specific GA account for our school and registered and enrolled each student to our classroom group. As I demonstrated the various technology tools, I incorporated the story element into my instructional approach. I delivered my presentation through Irish and questioned them wherever possible. Through a series of short instructional bursts, I showed them how to select a background, a character and some props. I showed them how to record their voices

⁵⁰ https://goanimate4schools.com/public_index

⁵¹ I provided them with the URL and their login details.

and add several sound effects and soundtracks. Students then engaged in a period of free play exploring and tinkering with the various features and functionalities of GA. Interestingly, all the students skipped the introductory video tutorial and explored the application themselves. I then presented their animations at the end of the session and students were very enthusiastic seeing their animations on the IWB as my field notes reveal:

I played some of the GA animations the students created in their twenty-minute free-play session in the computer room. They were so attentive as they watched them. Lots of excitement and clapping for students after each one. Séamus looked so proud when I played his and Fionn raised his hands in delight and looked around the room at students' reactions.

Afterwards, we returned to the classroom, where we completed a storyboard together. I then created another animation incorporating our story idea and their input. They had discovered several advanced features of GA during their free play session and guided me in their implementation. Some students came up to demonstrate them. John figured out how to animate characters and how to add a new scene. Naoise figured out how to resize objects and characters. Selena figured out the text-to-speech feature. Fionn showed the class how to zoom into and pan an image, simulating camera movement. Students were extremely involved, engaged and enthusiastic as the following exchange reveals. I never translated during this time and the students understood me, with one student speaking to me in Irish:

Rose: Táim chun beochan bheag a dhéanamh anois [I'm going to create a short animation now]. Roghnóimid an fear sneachta [Let's select the snowman]. Só, clic agus tarraing isteach ar an stáitse é [So click and drag it onto the stage].

Peter: Yeah!

Rose: Tá sé rómhór, nach bhfuil [He is too big, isn't he]? Tá sé rómhór, tá sé níos mó ná an teach [He is too big, he is bigger than the house]. Cad a dhéanfimid leis [What will we do with him]?

Naoise: You need to make him smaller.

Rose: Caithfimid é a laghdú [We need to make him smaller].

Fionn: Beag [Small].

Rose: É a dhéanamh beag [Make him small]. É a laghdú [Shrink him]. Naoise an bhfuil ceist agat?

Naoise: You can make him smaller by pressing the top right and push him down.

John: If you want to make him walk, go down to the part where he starts walking, put it in and click over there on the white ticks and blue ticks and a line down the middle. Then click the other side and that's where he'll walk.

Rose: Yes! Because it's a path, you're drawing a path. Very good. Did you try it?

John: Yeah.

Rose: Go maith [Great]! Féach anseo [Look up here]! Raghaimid síos go dtí Emotions agus feicfidh sibh go bhfuil [Let's go down to Emotions and you will see that]...b'fhéidir go bhfuil an fear sneachta ag gáire nó b'fhéidir go bhfuil sé brónach [may the snowman is laughing or maybe he is sad]. Nó, b'fhéidir go bhfuil sé ar buile [Or maybe he is angry]. Tá eagla air anseo [He's afraid here]. Agus tá áthas ansin air [And he's happy here]. Só, fágfaimid ar an gceann sin é [Let's leave it on this one]. Caithfidh tú do chuid oibre a shábháil [You need to save your work]. Go tapaidh, cuirfimid é ag, am...[Quickly, lets make him, am...]
Fionn: Ag siúl [Walking].
Rose: Ag siúl. Fionn, go raibh maith agat [Walking. Thank you Fionn].
Tugann tú na smaointe is fearr dom [You give me the best ideas]! Cuirfimid an fear sneachta ag siúl [Let's make the snowman walk].

8.2.2.2 THE STORYBOARD PHASE

As per the previous design cycle, students first engaged in the storyboarding process prior to digital recreation. The number of scenes was reduced from six to four to help students focus on their writing. Students were encouraged to embark upon their artwork once they had written their stories. They completed this activity in pairs as opposed to individually. Pairs were configured according to streamed ability for the first half of this iteration and mixed ability for the second half. We also introduced peer corrections where dyads of students swapped their stories with other dyads and corrected each other's work. The teacher always reviewed their stories before moving onto the next stage. The following illustration portrays one particular storyboard from this iteration. Each of the four scenes describes various types of weather. Students kept their artwork to a minimum in order to focus on their writing. They wrote more as a result and the language they used was grammatically correct. Furthermore, their sentences appear a lot neater and clearer as their writing became more fluent.

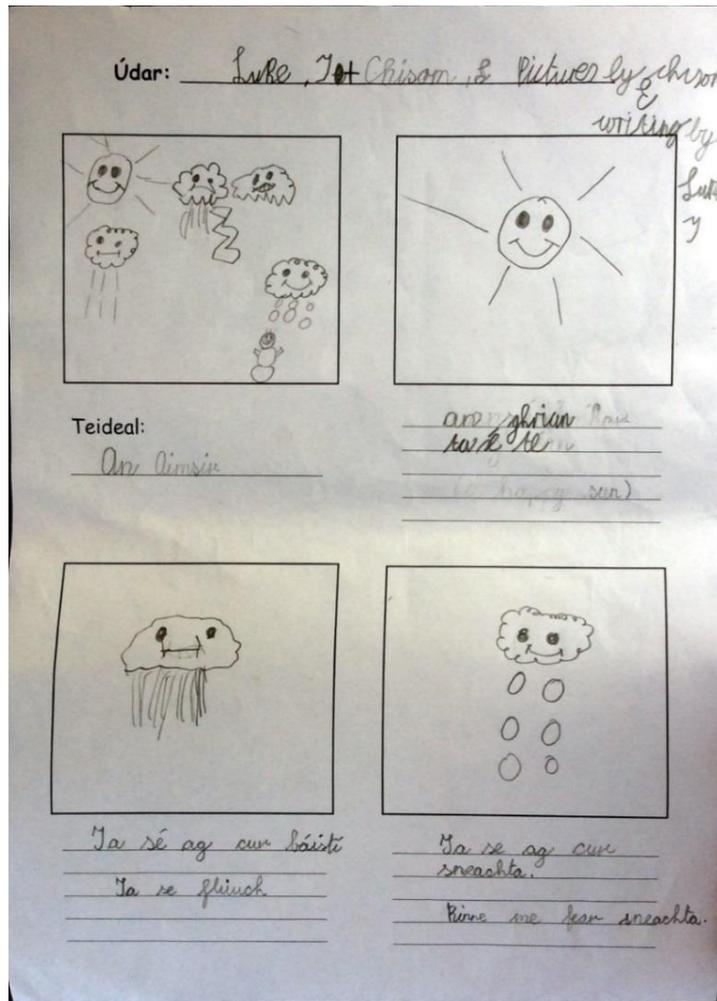


Figure 8.3: Completed Storyboard Template

8.2.2.3 THE DIGITAL RECREATION PHASE

Groups of three animated their penned stories in GA. The following illustration is based on the storyboard depicted above.

Table 8.1: Animated Story Created in Class





We also made the following changes to address the weaknesses that had arisen in the first iteration including adopting a more immersive approach to language, completing storyboards in pairs, reducing the group size from five to three for the digital recreation phase, having students present their own stories, the inclusion of a repository of images and audio files in our new technology tool, the introduction of peer corrections, and the incorporation of English/Irish dictionaries into learning activities. We also placed greater emphasis on students exploring language and technology tools, encouraging them to solve language difficulties and troubleshoot technical problems as they arose. We only stepped in when our assistance was required. Students discovered many new words and technology features in this way. These modifications to iteration two are discussed in the following section.



Figure 8.4: Students Learning Together

8.3 TWEAKS MADE TO ITERATION TWO

We implemented several changes to our second iteration based on our analysis of our first iteration (McKenney & Reeves, 2012). These modifications are in relation to our use of Irish in the classroom; our storyboard activity; and to technical and collaborative issues that had arisen during the previous iteration.

8.3.1 LANGUAGE

The teacher and I were aware of our overreliance on translating from Irish to English and practised a more immersive approach in this cycle. Instead of supplying a translation, we provided students with tools to find them and encouraged them to construct simple sentences with words already in their repertoire. Knowledge was internalised in this way as students were provided with opportunities to practise ‘their growing understanding of the new vocabulary in social settings’ (Applebee & Langer, 1986, p. 191). Even though they still did not speak to us in Irish, their ability

to comprehend Irish had improved as the teacher confirmed in our second interview: 'I think their comprehension is way up even if their expression isn't yet'. She also noticed how this immersive approach was helping her in her teaching:

Now I have to say it's paying off in the classroom, even for me in terms of my own teaching. I find that I'm talking more Irish and insisting on it. I'm saying 'no, I'm not saying that in English now, look at what I'm doing, I'm pointing to it', making them wait and get the wheels turning, getting them to look up the words...I'm not translating as much (Interview 2).

For instance, in our second storyboard session, the teacher gives some ideas for possible stories without having to translate to English:

Déan scéal faoin seomra ranga. B'fhéidir go bhfuil daoine ag pleidhcíocht, b'fhéidir gur bhuaíl duine eile, b'fhéidir go bhfuil duine ag luascadh ar chathaoir, b'fhéidir go bhfuil páistí ag imirt cluichí, b'fhéidir go bhfuil duine ag obair ar an ríomhaire. Más maith leat bain úsáid as an téacsleabhar, féach ar aonad a cúig. B'fhéidir go bhfuil abairtí gur féidir leat a úsáid agus go mbeidh cúpla smaoinemh nua agat. Gach duine ag déanamh clár scéalta faoin seomra ranga. Tá a lán focail anseo [*pointing to word cloud on IWB*], gach duine ag éisteacht, tá mise ag caint. [Write a story about the classroom. Maybe people are messing, maybe one person hit another person, maybe people are swinging on a chair, maybe children are playing games, maybe someone is working on the computer. Use your textbook, look at chapter five. Maybe you can use some sentences and you might have some new ideas. Everyone working on their storyboards. There are lots of words here, everyone listening, I'm speaking].

8.3.2 DICTIONARIES

We encouraged students to use English-Irish and Irish-English dictionaries to look up translations and to confirm spellings. Many students had their own dictionaries but we also borrowed some from a neighbouring class across the hallway. Using dictionaries enabled students to take responsibility for their own learning, promoting a more autonomous approach to language learning. Baumann et al. (2007) conducted a DBR study into vocabulary instruction with elementary students and found one of their teachers to be sceptical about her fifth-grade students' ability to use dictionaries but realised at the end of the intervention how beneficial they were. The teacher in this study was initially dubious but quickly saw their positive impact on Irish-

language learning. Students viewed this activity as a game and enjoyed looking up new words. They also became more confident and independent in their story writing.



Figure 8.5: Students Working Together

8.3.3 STORYBOARD ACTIVITY

My field notes from our final storyboard session indicates that the story writing activity had become easier to facilitate as the students had become used to this way of learning:

We really have very little to do during the storyboard sessions as the students have gotten the hang of it. Their stories are getting so much better. They're extremely quick now; they use their dictionaries and textbook for help, and only seem to call on us when they're stuck. It's like they want to work things out on their own, like it's a game, finding a word or correct spelling.

The teacher attached great importance to the storyboard activity as her students got 'to practise their writing and even drawing' especially as there was 'so little opportunity to draw something in third class' (Interview 2). She saw 'curriculum-imposed time constraints' as a deterrent to this type of lesson, however, stating students 'should get loads of time, but we don't have it to give to them' (ibid). To counter this, we reduced the number of scenes in the storyboard template from six to four to help students focus on their writing and according to the teacher: 'that made a big difference to the quality of their story writing' (Interview 3). She also emphasised the significance of students completing this activity on paper as opposed to using a digital storyboard application: 'it is important that they do their own writing and things like 'fadas' [an accent mark]... it's better for students to physically write it' (Interview 3). Furthermore, students were encouraged to keep their artwork simple and to embark upon it once they had completed their stories. As the teacher highlighted: 'They should be focusing more on the writing. The drawing parts of the storyboard activity should just be the basics of what we are going to show in the scene. It shouldn't be a masterpiece' (Interview 3).

Students completed the storyboarding activity in pairs as opposed to individually. Eighty nine percent of students (n=25) said that they preferred writing stories with others because it was more fun. Students wrote: 'Together in pairs because if you're stuck they'll help you', 'I liked doing a story together because I like the way that we can discuss stuff together' and 'I like being in pairs because I get more ideas' (Feedback Session 2). Three students preferred to work on their own, however, as they did not like 'arguing'. One of whom said: 'I like being on my own because I get more done quicker'. Interestingly, two of these three students had previously worked together in a group creating a digital story and they had disagreed over image selection and audio recordings during this time.

8.3.4 PEER CORRECTIONS

Once dyads of students completed the storyboard activity, they swapped their storyboards with other dyads for correction. Students reviewed each scene, highlighted any language errors and offered appropriate corrections. Barron et al. (1998) found that teachers were initially hesitant about students correcting each other's work as they were concerned about the quality of their corrections. The classroom teacher was also a little apprehensive at first. We found, however, that

this activity provided students with further opportunity to discuss language constructs with one another. In addition, students became more concerned with grammatical accuracy during the story writing process as a result. The teacher and I reviewed and discussed all corrections with students before moving on to the second stage of digital recreation.

Students found this activity challenging at first as they were not keen on having their language mistakes exposed by their peers. As Papert (1993b) notes, when it comes to making mistakes, students do not want to 'dwell on them, or think about them' (p. 114). One student was particularly upset when students found a spelling mistake in her story. The following dialogue illustrates her reaction:

Rose: Anois táimid chun na scéalta a bhabhtáil agus iad a cheartú. We're going to swap stories and correct them.
Carragh: What do you mean 'correct'?
Rose: Má tá sé i gceart, cuir tic leis [Tick it if it's correct]. Agus má tá botúin ann, ceartaigh iad [And if you find a mistake, correct it]. Faigh peann le dath eile [Get a different colour pen].
Róise: If it's good.
Rose: Cuir tic leis. Agus má tá botún ann, caithfidh sibh an focal a cheartú, é a litriú i gceart, mar shampla [And if there's a mistake, you need to correct the word, spell it correctly for example].
Carragh: Breithlá. Is that birthday? [*Reading story title*]
Clara: Breithlá, yeah [*she reads the story quietly*].
Teacher: An bhfuil sibh críochnaithe [Are you finished]?
Carragh: OK guys, we're finished correcting yours.
Clara: What did we get wrong?
Carragh: Nothing.
Seosamh: You spelled 'gaofar' [windy] wrong [*from the other group*]
Carragh: Gaofar?
Seosamh: You spelled it with G E, it's G A.
Carragh: No, that's how you spell it.
Seosamh: It's G A.
Carragh: That's how teacher spelled it.
Seosamh: You said G E, it said G E on it.
Carragh: No, that's an A.
Rose: An bhfuil sibh ceart go leor [are you ok]?
Seosamh: They wrote E and then we changed it to A. It was wrong on 'gaofar' so we changed it.
Carragh: Why did you have to tick it with a pen?
Seosamh: Cos we did.
Rose: Feicim. Tá an ceart ag Seosamh, Carragh [Seosamh is right, Carragh].
Litritear
'gaofar' mar G A O F A R [That's how you spell 'windy']. Anois, taispeán dom bhur scéal Seosamh [Now, show me your story, Seosamh]. An raibh aon bhotún anseo [Were there any mistakes]?
Seosamh: No.

Carragh: Actually, I think there was. I just can't read it cos the writing...
Rose: Tá breithlá Clara agus Seosamh ar siúl sa samhradh [Clara and Seosamh's birthdays are in summer]. Tá breithlá Séamus agus Ola ar siúl sa bhFómhar [Séamus and Ola's birthdays are in Autumn]. Is maith liom *mo breithlá* [I like my birthday].
Rose: Is maith liom '*mo bhreithlá*'.
Rose: Mo bhreithlá. Mo takes a séimhiú, a 'h'.

The following exchange between students during our final storyboard session reveals how one student noticed a missing síneadh fada (accent mark), something that students were not overly concerned with:

Rose: An ndéanfaidh sibh na scéalta a bhabhtáil, a chairde [Will you swap your stories]? Ceartaigh é sin, Áine [Correct this], agus ceartaigh é seo Amy agus Séamus [and correct that one].
Amy: Tá brón orm [I'm sorry]. Tick. Lá grianmhar a bhí ann [It was a sunny day]. Bhí Cáit agus Séimí ag siúl sa pháirc [They were running in the park]. Doesn't pháirc [park] have a fada [*accent mark*]?
Séamus: P H Á I R C.
Amy: Bhuail an liathróid Cáit [The ball hit Cáit]. Tá brón orm, arsa Séimí [I am sorry, said Séimí]. Do you want to tick it?
Séamus: Oh yeah, I'll just do one of them. Tá brón orm, arsa Séimí. Tick that. Tá Cáit agus Séimí ag caoineadh [They are crying]. Tá brón orm arsa Séimí agus Cáit.
Amy: OK, we're finished.
Rose: Aon bhotún?
Amy: We put a fada on A.
Séamus: Am, páirc.
Rose: Lá grianmhar a bhí ann. Bhí Cáit agus Séimí ag súgradh sa pháirc. Ó, ansin! Maith sibh!
Amy: What did we get? Did we get anything wrong? [*Referring to their storyboard*]
Séamus: No!
Amy: We got everything right!

8.3.5 DIGITAL RECREATION ACTIVITY

Group sizes were reduced from five members to three due to the acquisition of extra hardware. Groups were also configured according to streamed (similar) ability for the first four weeks and mixed ability for the remaining four weeks. We wished to observe student dynamics and to ensure that mixed ability was the best configuration for this type of activity. We also encouraged students to search the MCG clipart website graphically by category as opposed to searching using English words. As a result, they appeared to be more adventurous in their selection of graphics – up until then they had only searched for simple words like 'bat' and 'dog' as they were easier to spell. Searching in this way also limited their use of English in Irish lessons.



Figure 8.6: My Cute Graphics: Search by Halloween Category

In addition, the availability of a repository of images, music and sound effects within GA had the effect of reducing cognitive demand, distraction and time spent on tasks such as image sourcing and design. In this way, technology helped to focus students' efforts on more productive learning by offloading routine and nonsalient parts of the task (Reiser, 2004). Students had already learnt skills such as searching, downloading, importing, editing and designing images in the first iteration. This transfer of learning now enabled them to call on these skills whenever the need arose. Reducing cognitive load in this way helped students to focus on important tasks relevant to their learning goals (Quintana et al., 2004) such as on their story writing and their animations.

8.3.6 STUDENT PRESENTATIONS

Students presented their own animated stories in this iteration. They showed greater interest and reacted more enthusiastically to each other's presentations compared to when the teacher presented them in the previous iteration. In the following vignette, I invite Fionn to present an animation that he created at home. Even though it is in English, it is a great example of an animated story. It incorporates dialogue, plot, characters, background, props, music and closing credits. He plays it on full screen for the class. There is lots of laughter. Fionn looks down at the class from time to time to check their reaction. He is beaming with pride. The following dialogue reveals the students' reactions at the end:

Peter: Rose, this is like a cartoon!
Rose: Tá's agam [I know]! Tá sé ana-mhaith [It's very good]! [*Huge round of applause from the class at the end*]
John: That was awesome!
Peter: That was so good!
Rose: Fionn, bhí sé sin go hiontach [That was fantastic]! Ar chuala tú cad a dúirt Peter [Did you hear what Peter said]? Dúirt sé go raibh sé cosúil le cartún agus do bhí [He said it was like a cartoon and it was]!
Naoise: It was funny too!
Rose: Bhí scéal iontach ann [There was a great story to it]. Bhí tús, lár agus críoch ann [He had a beginning, middle and end] [*Another round of applause*].
Fionn: That was class!
Ruth: I want to see Fionn's again, that was so good!
Fionn: That was class. Thank you!

8.4 OBSERVATIONS FROM ITERATION TWO

I discuss my main observations from design cycle two under the following themes: language, learning activity, technology and engagement. As aforesaid, these themes relate to the set of design conjectures and requirements that I set out in chapter 6. The conjectures around TALES encompass fostering language-in-use in a communicative, meaningful way; the pedagogical application of technology using animated storytelling; and the promotion of collaborative learning through scaffolded instruction and peer learning.

8.4.1 LANGUAGE IN USE

We noticed an improvement in their attitude towards Irish; they worked hard on their learning tasks, were eager to get started and slow to wrap up. Their comprehension of Irish improved as this iteration progressed, but they were still quite slow to speak to us in Irish as the teacher observed below:

Receptively, there's a huge improvement. They understand better. I don't have to repeat or explain myself as much anymore, even the weaker children, you don't have to give them as much help. They've a more positive attitude towards Irish as well. Expressively, I suppose I don't see as much improvement in all the children. You definitely see it in the better-able children. They're much more likely to try and put sentences together (Interview 2).

She referred to their Christmas test results and noted how their results for Irish were higher compared to other subjects and believed this was due to their increased interest and confidence in the Irish language:

This year's class has probably made more gains compared to last year's class. They did very well in their Christmas tests, and on average, they're much higher than other subjects. It's probably due to an increase in interest, but I think they feel better about their own ability in Irish. They have a greater confidence in themselves. What I used to find with Irish tests is you'd get a lot of blanks...whereas you don't get as many blanks anymore. The innovative approach is kind of a more natural way of learning Irish because they're not really focused on the language, they're more focused on the task and the language is kind of like a by-product of the activity, whereas the other way, I suppose the traditional way of teaching is very focused on language (Interview 2).

The following four vignettes illustrate the students' progression through this iteration in terms of their spoken Irish. At the beginning it is clear they understand us, but respond in English or in Irish using one or two words. Towards the end of this iteration, however, they had become quicker in their responses and endeavoured to speak in Irish to us. The first example depicts a typical exchange between us and the students at the beginning of our second storyboard session, where they understand Irish and attempted to reply to us in Irish:

Rose: Cad a bheidh ar siúl i gceann coicíse [What's happening in two weeks' time]?
Jack: An Nollaig [Christmas]. Oíche Nollag [Christmas Night].
Teacher: Oíche Nollag!
Rose: Beidh sibh ar laethanta saoire [You will have holidays]. Cad iad laethanta saoire [what are holidays]?
Cian: Ní bheidh scoil ann [No school].
Dáithí: Holidays!

During our third technology session, the teacher reminds the students that they can change the colours of the leaves. She shows them from the IWB and directs Séamus as he changes them. The following dialogue reveals how much their comprehension of Irish has improved:

Seosamh: Put some leaves on the ground and then write Breithlá [Birthday] in between the balloons. Teacher: Agus is féidir libh na dathanna ar na duilleoga a athrú [And you can change the colour of the leaves]. Dearg, órga, mar shampla [Red, gold, for example]. Clic ar an duilleog [Click on the leave], Séamus, agus clic ar 'Colours'.

Seosamh: Oh, I didn't see that.

Clara: Me neither.

Teacher: Ar mhaith leat dath nua [Would you like a new colour]? Ar mhaith leat dath eile [Would you like another colour]?

Seosamh: That one there, Séamus. Put like blue ones everywhere.

Teacher: Nó an ceann seo [Or maybe this one]?

Seosamh: The other one, Séamus.

During our final storyboard session, students explain their story to the teacher in Irish:

Teacher: Bhí Rossa agus Neasa sa pháirc ag pleidhcíocht [Rossa and Neasa were fooling around in the park]. Thit Rossa agus Neasa as an gcrann [They fell out of the tree]. Bhris Rossa agus Neasa briste, bhris Rossa agus Neasa...[They broke...].

Séamus: Bhris an lámh [The arm broke].

Teacher: Bhris Rossa agus Neasa a lámha, só bhris Rossa a lámh agus bhris Neasa a lámh [Rossa and Neasa broke their arms, so Rossa broke his arm and Neasa broke her arm]?

Séamus: S'ea [Yeah].

Teacher: Tá lámh briste ag Rossa agus lámh briste ag Neasa [Rossa has a broken arm and Neasa has a broken arm]?

Séamus: Lámha [Arms].

Teacher: Beirt acu [Both of them]? Dhá lámh [Two arms]?

Séamus: Lámha [Arms].

Teacher: OK. Bhris Rossa agus Neasa a lámha [Rossa and Neasa broke their arms]. Ana mhaith [Very good]!

In our final technology session students immediately comprehend my questions and instantly reply in Irish. Students also begin to speak in Irish with one another:

Rose: Tá sibh ag obair mar ghrúpa [You are working as a group]?

Seosamh: We're going to work together.

...

Cian: Oh, get a boy and a girl.

Seosamh: Buachaill agus...[Boy and...].

Ruth: Buachaillí agus cailín [Boys and girl].

...

Seosamh: How do you say we need help in Irish?

Cian: Níl a fhios agam [I don't know].

Seosamh: Níl a fhios agam? I don't know?

Cian: No, I don't know the answer to it.

Rose: OK, an bhfuil sé críochnaithe agaibh [Are you finished]?

Cian: Tá. Tá mé...[Yes, I am...].

Seosamh: Tá mé críochnaithe ag obair [I am finished working].

...

Cian: Did you take teacher's chair?
 Seosamh: Ah is maith liom cathaoir [I like chair].
 Teacher: An maith leat mo chathaoir [Do you like my chair]?
 Seosamh: Pardon?
 Teacher: An maith leat an chathaoir [Do you like the chair].
 Seosamh: Is maith liom an cathaoir [I like the chair].
 ...
 Rose: Cad atá ar siúl agaibh [What are you doing]? An bhfuil sibh ag méiseáil [Are you messing]?
 Seosamh: She's doing it!
 Cian: Bhí sí ag méiseáil [She was messing].
 Rose: Ní bhíonn Ruth riamh ag méiseáil [Ruth never messes]! Aingeal is ea Ruth [She's an angel]!
 Ruth: I'm an angel.

8.4.2 LEARNING ACTIVITY

The teacher is still transitioning from her traditional approach to instruction to our innovative approach involving short bursts of instruction. In terms of our scaffolding approach, we both need to be more mindful of this going into our next iteration. Students created animated stories for junior infants encapsulating an Irish lesson aimed at their age group. They also presented them to the students in the junior infant's classroom. This proved to be an additional motivational factor for students as they were extremely engaged in this particular exercise. When students design artefacts for others their 'learning becomes instrumental to a larger intellectual and social goal' (Kafai, 1996, p. 72).

8.4.2.1 INSTRUCTION BURSTS

The transition from a traditional approach to shorter instructional bursts was ongoing during this iteration. During our second storyboard session, for example, the teacher and I chat to the class about some ideas for creating an animation involving an Irish lesson for junior infants. The teacher, however, reverted back to her traditional way of giving information instead of questioning and drawing ideas and language from them. She moves towards a more interactive approach as the lesson proceeds, however:

Teacher: Cad iad na rudaí atá á dhéanamh ag na naíonáin shóisearacha [What are junior infants learning]?
 Cian: Na huimhreacha [numbers].
 Teacher: Ana mhaith. Na huimhreacha. A haon go dtí a cúig. Sin é Aon, Dó, Trí, Ceathair, Cúig [Good. Numbers. 1 to 5. 1,2,3,4,5].
 Susan: Dathanna [Colours].

Teacher: Agus na dathanna simplí. Dearg, bán, dubh, gorm, glas, buí, oráiste. Ní dubh gorm agus liath mar tá siad ró dheacair [Simple colours. Red, white, black, blue, green, yellow, orange. Not navy and grey, they're too hard].

John: Feirm [Farm].

Rose: Go hiontach. Cad é an foclóir le haghaidh feirme [What kind of words]?

Teacher: Tarracóir, bó, caora, cúpla rudaí simplí (sic) [Tractor, cow, sheep, a couple of easy things].

Cian: Éadaí [Clothes].

Teacher: Go maith. B'fhéidir, ná déanaigí lámhainní agus buataisí [Maybe don't do glove and wellies]. B'fhéidir geansaí, sciorta, bríste, bróga agus hata, agus sin é [Maybe jumper, skirt, pants, shoes and hat, and that's it].

Rose: Aon smaoineamh eile [Any other idea]?

Susan: Seomra ranga [Classroom].

Rose: Fuinneog, b'fhéidir [Window, maybe]? Aon rud eile [Anything else]?

Naoise: Úrlár [Floor].

Róise: Clár bán [Whiteboard].

Peter: Ríomhaire [Computer].

Rose: Maith sibh [Well done]!

Teacher: An aimsir, b'fhéidir faoi na ceithre séasúr agus cad a tharlaíonn i ngach séasúr [Weather, maybe, the four seasons, what happens during the seasons]?

Rose: Cad iad na séasúir arís [What are the seasons]? Éinne [Anybody]?

Cian: Samhradh [Summer]?

George: Is that summer?

Fionn: Yeah, that is summer.

Teacher: An samhradh bhí ann [It was summer]. Agus scríobhfaidh mé na trí cinn eile, só an samhradh, an fómhar, an...[And I will write the other three, so summer, autumn...].

Rose: Aon cheann eile agaibh [Anybody else]? Susan?

Susan: I know it, but I don't know how to say it.

Rose: Bain triail as [Try it].

Susan: An tEarrach [Spring].

Rose: An tEarrach! Agus dúirt tú i gceart é! Go hiontach [And you said it correctly, well done]!

Teacher: Ana mhaith! Féach, an samhradh, bhí an ghrian ag taitneamh [Look, summer, the sun was shining]. An fómhar, thit na duilleoga [Autumn, the leaves fell]. An geimhreadh, b'fhéidir ah go ndéanfaidh tú fear sneachta agus an tEarrach [Winter, you might make a snowman and Spring]. Cad a tharlaíonn [What happens]?

Cian: Bláthanna [Flowers].

Teacher: Ana mhaith. Bíonn na bláthanna ag fás. Bhí an ghrian sa spéir. Bhí sé...[Flowers grow. The sun was in the sky. It was...].

Naoise: Bhí sé te [It was hot]!

Teacher: Nuair a bhíonn an fómhar againn, cén sort aimsire a bhíonn ann [When it's autumn, what kind of weather do we have]?

Cian: Scamallach [Cloudy]?

Cian: Gaofar [Windy].

Jack: Sneachta [Snow]?

Rose: An mbíonn sé te [Is it hot]?

Voices: No!

Rose: No, bíonn sé...[It's...].

Jack: Fuar [Cold].

Susan: Ag cur sneachta [Snowing].

Teacher: Ag cur sneachta agus ag cur...[Snowing and...].

Susan: Ag cur báistí [Raining].

8.4.2.2 SCAFFOLDING

There were moments when the teacher could have scaffolded student learning better and these moments served as reminders to pay more attention to such instances in the third iteration. Her approach developed as this iteration progressed, however. The following two vignettes illustrate her progression. In the following exchange, during our first storyboard session, the teacher helps the students but gives them the information they want more than drawing it from them:

Dáithí: What's the Irish for 'Santa leapt up the chimney'?

Teacher: Taispeán dom. Daidí na Nollag [Santa Claus]. Bhí Daidí na Nollag bronntanas faoi an crann [Santa Claus was presents under the tree].

Teacher: Só [*she corrects and writes on their sheet*]. Bhí bronntanas faoin gcrann [The presents were under the tree]. Só, faoin is F A O I N. Sin pictiúr a haon [That's the first picture]. Cad a tharla ansin [What happened then]?

Dáithí: Santa leapt up the chimney.

Teacher: Chuaigh sé, he went. Chuaigh sé suas an...[He went up the...].

Teacher: Cad é chimney as Gaeilge [What is the chimney in Irish]? An sim...[The chim...].

Dáithí: Ah [*clicking his fingers trying to remember*]

Áine: An simlí?

Teacher: An simléar [The chimney]. Yeah! Cúig [Five]...sin uimhir a cúig [that's the number five]...Chuaigh is went...C H U A I G H.

Teacher: Bhí deifir air. It means 'he was in a hurry'.

Dáithí: I know, but we don't know 'to deliver', we don't know what the Irish for 'deliver' is.

Teacher: Bhí deifir air na bronntanais go léir...[The presents, he was in a hurry to...].

Dáithí: A thabhairt do na páistí [To give to the children]?

Teacher: Ana mhaith.

The following dialogue reveals the teacher's scaffolding approach during our final technology session and how her approach has evolved to scaffold learning in a more effective way:

Teacher: Cad atá á dhéanamh aige [What is he doing]?

Séamus: Tá sé an madra [He is the dog].

Teacher: Tá an madra ag [The dog is], cad atá á dhéanamh aige [What is he doing]?

Tá sé ag...[He is...].

Séamus: He's trying to catch the bat.

Teacher: Tá sé ag...[*she gestures a running action*]

Séamus: ...rith [...running].

Teacher: Rith, ana-mhaith! Cad atá á dhéanamh ag na rudaí seo [What are these things doing]? [*pointing at the bats*]

Séamus: They have to fly around and the dog has to catch them.

Teacher: Tá siad ag...[*gestures a flying action*]

Séamus: ...eitilt [...flying].

Teacher: Ana-mhaith!

There was an element of calmness in the classroom. I initially thought that this was due to our new grouping configuration as there was a lot less discussion and arguing within streamed groups. But as the iteration progressed and we reverted to mixed ability groups, it became evident that it had little to do with group configuration but instead students were becoming better accustomed to this way of learning. The following vignettes reveal how the students have adapted to this new way of learning as the iteration unfolded. The first involves students translating an English sentence to Irish, the second portrays students figuring out a grammatical construct and the third reveals another pair of students working out a translation.

In the ensuing exchange (second storyboard session), Peter asks me to translate a complete sentence with two clauses. Seosamh tells me he cannot find it in the dictionary. I ask them to break it down and they manage to translate the sentence themselves:

Seosamh: How do you say 'Santa is hiding in his sleigh in the air'?

Peter: In the sky. Could you help us?

Rose: OK.

Seosamh: We can't find it [*in the dictionary*].

Rose: Well, you have to break it down into smaller steps.

Seosamh: Tá Daidí na Nollag [Santa Claus is]. Bhí Daidí na Nollag [Santa Claus was].

Rose: Go maith. Faigh d'fhoclóir [Good. Get your dictionary]. Tá abairt fada agaibh agus caithfidh sibh é a bhriseadh suas [You have a long sentence and you will have to break it up].

Seosamh: So, like bhí Daidí na Nollag...

Rose: S'ea.

Seosamh: Ar an slé [On the sleigh].

Peter: Slé suas sa spéir [Sleigh up in the sky].

Rose: S'ea [Yeah]!

Peter: Le a lán reindeers [With a lot of reindeer].

Rose: Len alán...faigh 'reindeer' san fhoclóir [With a lot...look for reindeer in the dictionary].

During our third storyboard session, the students and I work through the grammatical construct 'article plus masculine noun beginning with a vowel':

Rose: What is spring again?

Carragh: Is it t-earrach [spring]? T E A?

Rose: S'ea, an t-earrach.

Róise: T E?
 Rose: Do you know that if you don't have the word 'an', you don't need the T.
 Róise: But if you do have 'an', you need the T.
 Rose: Go maith! Má deireann tú 'an t-earrach', tá T ag teastáil [If you use 'an', you need a T]. Ach 'Earrach' leis féin, níl aon T ag teastáil [No T if it's on its own].
 Róise: Well I wanted to write lamb.
 Carragh: You can write 'uan' [lamb], you don't need the T remember.
 Rose: Abair liom, cén saghas aimsire a bhíonn ann san earrach [Tell me, what kind of weather do we have in autumn]?
 Róise: Am, gaofar [windy].
 Rose: Bíonn sé gaofar [It's windy]. An mbíonn sé te [Is it hot]?
 Carragh: What's 'gaofar' again?
 Rose: Gaofar. Bíonn sé fuar [Windy. It's cold]!
 Carragh: Oh yeah, I know that, windy.
 Róise: Fliuch [Wet].
 Rose: Bíonn sé fliuch. Bíonn sé fliuch san earrach [It is wet in autumn].
 Sara: So I can write that?
 Sara: Bhí...
 Carragh: H I with a fada [accent mark]. Is it with a fada?
 Rose: S'ea.
 Carragh: S E, the E is with a fada as well.
 Carragh: How do you spell 'fliuch'?
 Rose: Róise?
 Róise: F L...
 Sara: Wait, F L...
 Róise: I U C H.
 Rose: Maith thú!

During our final storyboard session, I help Séamus and Amy with a translation for their story:

Séamus: Rossa and Neasa fell out of the tree. How do you say that in Irish?
 Rose: Cad é an Ghaeilge ar 'tree'?
 Amy: Crann [tree].
 Rose: Crann. Go maith! Agus cad a tharla do Rossa agus Neasa [And what happened to Rossa and Neasa]?
 Séamus: They fell out of the tree and broke am...
 Amy: They were playing.
 Rose: Cad é an Ghaeilge le haghaidh 'playing' [What is the Irish for playing]?
 Séamus: They were playing, like messing in the tree.
 Amy: Pleidhcíocht [messing].
 Séamus: And then they fell out of the tree and broke their backs.
 Rose: Go maith Amy! Má thiteann an peann ar an úrlár [If this pencil falls on the floor]? Cad a tharla don pheann [What happened to the pencil]?
 Séamus: Thit [Fell]! Thit Rossa agus Neasa am sa páirc [They fell at the park].
 Rose: Sa pháirc [At the park].
 Séamus: Sa pháirc.
 Rose: Só, thit Neasa agus Rossa from the tree [So, they fell from the tree].
 Amy: Crann.
 Rose: S'ea. Ana-mhaith Amy. Go hiontach.
 Amy: So thit, T H I T.

8.4.2.3 STUDENT COLLABORATION

We found that 70% (n=19) of students liked working in groups (Feedback Session 5). As aforementioned, we trialled similar-ability configuration and noticed that lower ability groups achieved less during this time. Their animated stories only incorporated images, animations and music, with no text or narrations, despite having completed their storyboards. My field notes reveal:

Students were on-task today. Similar-ability groupings made it a lot easier to manage group work in the classroom as they seemed to work a lot better together. Less arguing compared to mixed groups and no messing.

I also noted the following observations after our first storyboard session:

One group (low ability), Conall and Ciarán copied a story directly from chapter nine in the textbook. They did it together, quietly and neatly. In another group (high ability), Cian worked very hard and John looked up the dictionary a lot. He found 'comhthíoch' for alien. We looked it up together afterwards and I suggested that 'eachtrannach' might be a better word to use. He found 'fuadaigh' for kidnap. I suggested he keep it simple and just use 'tóg'. They wrote a great storyline! In another group (high ability), Rita is a very well-able student. Very bright, interested and motivated to learn. In trying to translate 'the candle fell on the Christmas tree'. She pieced it together herself: 'Thit an coinneal'. Clara is another wonderful student, clever and interested. They had a very good storyline. No pictures. They concentrated on the plot and writing their story.

When groups reverted back to mixed-ability for their third storyboard session, my field notes indicate the same relaxed working atmosphere as per previous weeks where they were grouped according to similar ability:

Groups worked so well together. Needed very little attention. Hum of work and conversation, but no shouting. A very relaxed atmosphere.

As aforesaid, I felt students had grown used to learning collaboratively. I feel similar ability grouping would be a good approach to take early on in the process as students first embark on collaborative learning approaches in the classroom.

During this iteration, students also started interacting with one another on our GA platform, commenting on each other's animated stories. While most of them were written in English, they gradually started writing them in Irish as the iteration progressed.

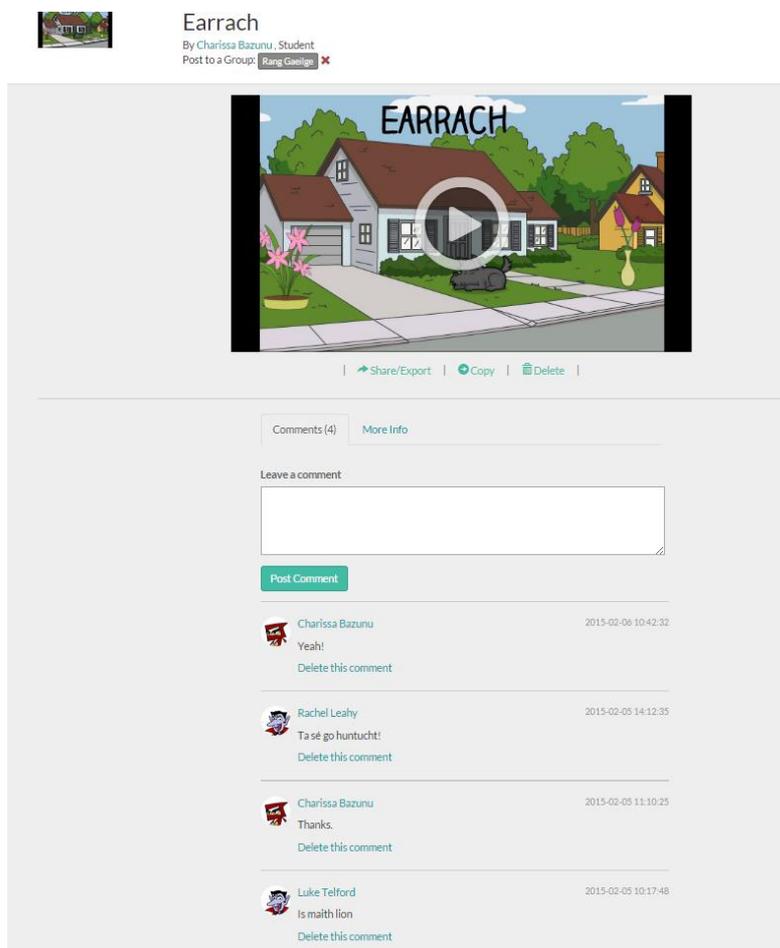


Figure 8.7: Students Interacting on GA in Irish

8.4.2.4 PEER LEARNING

Students coached each other and learned from one another during this iteration. Their learning mostly revolved around spellings and translations, extending to grammatical constructs from time to time. They also helped each other with their digital design and voice recordings. The following four vignettes involve students negotiating punctuation, spellings and a grammatical construct while the latter two

portray students helping each other with their voice recordings and animation creation.

During our second storyboard session, Rita helped Clara with her punctuation and spelling:

Rita: I want to do 'bréagáin' [toys].
Clara: What's 'bréagáin'?
Rita: Toys. You do the writing. Clara, why don't you do a capital at the start?
Clara: I forgot!
Rita: It's 'liathróid' [ball]. L I A...
Clara: Do you know how to spell it?
Rita: Yeah, I think it's L I A T O I D.
Clara: But isn't there a H in it?
Rita: No.
Clara: L I A T H R O I D [*she spells it correctly*]
Rita: L I A T H
Clara: R O I D.
Clara: Ríomhaire [computer] is next.
Rita: So R
Clara: I, fada [*accent mark*] over the I,
Rita: O
Clara: M H A I R E
Rita: Yeah.

In the ensuing exchange, Seosamh and Peter figured out the correct pronoun to use:

Seosamh: What will I write for the last one?
Peter: Bhí Santa, thug Santa bronntanas do pháistí [Santa Clause gave the kids gifts].
Seosamh: Yeah, but...aige páistí [with kids].
Peter: No, no, thug Santa...uhhh...do pháistí [Santa gave to the kids].

In our third storyboard session, Dáithí and Áine negotiated language around their story. They tried to work it out on their own, without my assistance, using their textbook, grammar copybook and dictionary:

Dáithí: Faoi an crann nollag bronntanas [Under the tree gift].
Áine: No, it's 'bronntanas faoi an' [Gift under the].
Dáithí: So, it's bronntanas faoi an crann nollag [Gift under the Christmas tree].
Áine: Yeah. Chuir daidí na nollag an bronntanas faoi an crann nollag [Santa Claus put the gift under the Christmas tree].
Dáithí: So how would we say he left? He went up the chimney?
Áine: Ask Rose.
Dáithí: No, don't call her yet. We can figure it out.

Áine: He left with his reindeers [flicking through the pages of her textbook].
 Dáithí: Reindeer. Now, what's the Irish for reindeer again?
 Áine: It's somewhere.
 Dáithí: Have you got an Irish dictionary?
 Áine: Oh! 'Reinfhia' [reindeer]!
 Dáithí: Now, the last one. So basically a boy came down and started opening the presents.
 Áine: Maybe am he woke up.
 Dáithí: What's the Irish for that? It should be in our grammar copybook.
 Áine: I'll go and get it.
 Áine: So orm, ort, air, uirthi, orainn, orthu [On me, on you, on him, on her, on us, on you].
 Dáithí: No, that's not it.
 Áine: Oh yeah, woke [flicking through pages].
 Rose: Áine, an raibh tú i mo lorg?
 Áine: We're trying to find 'woke', am the 'boy woke up and saw the presents'.
 Rose: So to wake up. Just think about it.
 Áine: Dúisigh [Wake]!
 Rose: S'ea! Áine!
 Áine: Dúisigh sí [She work up].
 Rose: S'ea! Tá sé agat! Ach dhúisigh sí [But she woke up].
 Áine: It's a boy.
 Rose: Só, dhúisigh...
 Áine: ...sé [he].
 Dáithí: I haven't a clue how to spell this.
 Rose: Bain triail as [Try it]?
 Áine: I'll find it here.
 Rose: Maith sibh! Faigh an chuid eile sa leabhar mar sin [Well done! Find the rest of it in the book so].

During our final storyboard session, a student explains an Irish peculiarity to another student:

Séamus: What's arm in Irish?
 Amy: Lámh [arm]. L Á M H
 Séamus: L Á...
 Amy: No, that's hand.
 Séamus: I know it is but it's all 'lámh' [pointing all along his arm to his hand].

In the following vignette, students help each other with their voice recording:

Sara: You don't go back and record the voices, you practise a few times, like two or three times, and then we can do the recording.
 Aileen: How do you do it again?
 Sara: Wait, let me try.
 Aileen: Can you get teacher down to tell us how to record it?
 Sara: I just need to do this. Wait two seconds. Ok, ready!
 Sara: Actually instead of 'milseáin' [sweets], am, 'ní maith liom milseáin' [I don't like sweets], should we say 'is maith liom' [I like sweets] because everyone likes sweets.

Aileen: Tá bainne bán [milk is white] agus sú oráiste [orange juice is orange]. Is maith liom bainne agus sú oráiste [I like milk and orange juice].

Róise: Make it so clear that they [infants] can hear it.

Sara: Say it a little louder, maybe.

Aileen: Tá bainne bán agus sú oráiste. Is maith liom bainne agus sú oráiste.

Aileen: Do you want to hear it?

Róise: Yeah. And then you can hear it Sara.

Róise: Yeah, that's way better.

Aileen: Are you going to do yours?

Sara: Yeah, that's good. It's clear enough.

Aileen: I'm so perfect! Ha!

Aileen: OK, Róise, look at that. 3, 2, 1, go.

Róise: Tá arán bán agus donn. Tá crispí buí. Ní maith liom milseáin [Bread is brown and white. Crisps are yellow. I don't like sweets].

Aileen: OK.

Róise: Tá arán bán agus donn agus tá crispí buí.

Sara: Can I hear it?

Róise: Yeah. It's rubbish.

Aileen: Well, it's good.

Sara: Do you want to do it again?

Róise: Yeah.

Sara: 3, 2, 1, go.

Róise: Tá arán bán agus donn. Tá crispí buí. Ní maith liom milseáin.

Aileen: Oh my goodness, that's brilliant.

They also shared their knowledge with each other when it came to animation creation, for example in the third technology session, Clara figured out character customisation attracting interest from other students:

Clara: I don't know what clothes to do.

Seosamh: Look, just wear what you had on you.

Clara: Now, face.

Seosamh: Ah, Jesus.

Clara: No, I'll leave my face the way it is. I'm just changing my hair.

Seosamh: That looks alright.

Séamus: No that one there! [Séamus laughs]

Seosamh: That! [not impressed]

Séamus: No, that doesn't suit you, that does nothing for you.

Clara: Yeah, that's nice.

Séamus: Yeah, that's good.

Voice: Clara? How did you get the characters? [*Students are looking up at the IWB and asking her questions while she works*]

8.4.3 TECHNOLOGY

Students had trouble accessing GA initially as the URL was a long and non-descriptive one. I created a shorter URL using a URL shortening application called fur.ly⁵² and shared it with our students. We also created a shortcut icon to GA on each desktop. Students had difficulty entering a CAPTCHA⁵³, a security measure upon first logging into their GA accounts. Students helped each other with this logging-in process. It took us 12 minutes to log everyone into their accounts on our first day but they learned a new practical skill in the process. GA's interface is composed of a series of tabs representing backgrounds, characters, props, audio, music and text. They served as a guide for students to incorporate these features into their stories. In this way, GA scaffolded learning, often acting as a checklist and a reminder to students in terms of what they had achieved and of pending tasks to complete. Scenes helped students navigate through their story and the preview button enabled students to test their stories for errors and incoherency.

When it came to students learning the technology, the teacher was impressed with the way they figured it out:

Even knowing where things are in Go Animate and knowing how to get things – that was a big application. They were flying around, whereas it would take me a bit more time to kind of navigate around it (Interview 3).

She was also impressed with how students figured out more advanced features of GA and how they showed us, such as the time they learned how to customise people:

Even that time that they sorted out how to create Santa Claus by customising a character. We didn't know you could do that! They're teaching us, they're really in tune with technology and I think that we're just not giving it to them as much as we should be (Interview 2).

⁵² <http://www.fur.ly/>

⁵³ CAPTCHA is an acronym for 'Completely Automated Public Turing test to tell Computers and Humans Apart'. It is a type of challenge-response test used in computing to determine whether or not the user is human (<http://en.wikipedia.org/wiki/CAPTCHA>, 12/12/2014).

One of my questionnaire respondents echoed her words in a follow-up interview:

The kids taught me and I think that was a big change for me as a teacher because before that, as a teacher your grip is so tight on what they are learning and how they are learning...I think it's a release now because I realise, I can learn from the kids as well and they have a lot to offer (Kate, 2015).

As the iteration proceeded, students relied less upon us when it came to using technology in the classroom. They were far more capable at troubleshooting problems themselves. As the teacher revealed: 'they don't really call us for technical things anymore, just language questions and Internet connectivity mostly' (Interview 2). In our third digital session, for example, one group's animation froze and we had to relaunch the browser. Séamus surprised me when he pointed to an editing icon, which he called 'scríobh' [writing], that functioned as a shortcut to opening their animation, something I had not known:

Rose: An féidir liom suí isteach anseo le féachaint [Can I sit in her to look]? Cén cuntas é seo [Whose account is this]? Ceann Seosamh [Seosamh's one]?
Seosamh: We did it a while ago, Rose, we did it twice like and it didn't work for us.
Rose: Déanfaimid uair amháin eile é mar sin [We'll do it one more time so]. [*I close and reopen the browser window, and reenter the GA URL*]
Séamus: Press the Scríobh button, scroll over there. Yeah.
Rose: Séamus! Tá tú go hiontach [You are wonderful Séamus]!
Séamus: Why?
Rose: Shocraigh Séamus é [Séamus fixed it]. Só, Seosamh isteach leat [So in you go Seosamh]!
Clara: Are we starting again?
Teacher: Níl, tá sé ag obair anois mar bhí smaoinreamh ag Séamus ansin [No, it's working now because Séamus had an idea].

8.4.4 ENGAGEMENT

I felt that our smaller group size helped sustain students' attention as they engaged in their learning activities. Students described them as being fun, creative and awesome with one student saying 'I love doing stories in Go Animate. Hope we can do it all the time' (Feedback Session 4). 93% of students (n=25) thought our approach of using storyboards and animations was a good way to learn Irish (Feedback Session 5). The teacher also enjoyed using Go Animate in our innovative Irish lesson activities:

I really like Go Animate. The end product is very professional looking and it's intuitive to use... The kids are finding it very easy and I thought it was going to be a lot trickier to use in class. Students definitely need a minimum skill level to use it though, which they nearly all have by now (Interview 2).

In our second technology session, I overheard Aileen and Róise explaining to Sara, a new girl who had recently joined the class, that they were 'really doing Irish'. Even though the rest of our students had adapted to this new way of learning, Sara was unsure. As the iteration progressed, she became more comfortable recording her voice in Irish and in writing her stories. Her mother later communicated how she had 'grown much more confident in the Irish language especially considering it's not our native language. Thank you for all the hard work with her' (21/05/2005).

I had their full attention from the outset. They enjoyed creating animations and were very eager to get started as my field notes reveal: 'I presented my animation and the students seemed mesmerised. Complete silence. Very attentive. They were super excited to start using GA'. During their first technology session, students were on-task: 'They're all standing up around the laptop, nobody is sitting down, they are all working together'. We also received some spontaneous parental feedback midway through this iteration about how much their children were enjoying our innovative activities:

I had Róise and John's mothers in during the week saying how much they love Go Animate and wanted to thank you! John's mom said he was really interested in Irish and in animation and she couldn't keep him away from it at home! (Email Correspondence, 12/12/2014).

Towards the end of the iteration, however, some students began to lose interest in GA. In our fifth feedback session, we found that 78% (n=21) of students were ready to try out a new application.

As per the previous iteration, students engaged with animated storytelling outside of the classroom. We also learned that they spent three hours a week, on average,

working on their animations outside of school (Feedback Session 5). Even though they created 170 Scratch stories at home, only 11% were in Irish (n=18). Interestingly, this class reengaged with animated storytelling when in fourth class as they created a further 23 English animations the following year. Áine created two Irish animations out of a total of 21. She incorporated text, audio and motion. One of her Irish animations is illustrated below and concerns counting people and objects.

Table 8.2: Áine's Animated Irish Story Created Outside of Class



Carragh created 23 animations at home and three were in Irish. Her story below is about a family waking up on Christmas morning.

Table 8.3: Carragh's Animated Irish Story Created Outside of Class



Larry created 13 animations at home, six were in Irish but he did not include any voice recordings. One of his animations is illustrated below and involves aliens kidnapping Santa Claus and eating him.

Table 8.4: Larry's Animated Irish Story from Home



Larry created another animation in Irish about numbers. One student left a comment saying how it helped her cousin to learn to count in Irish.

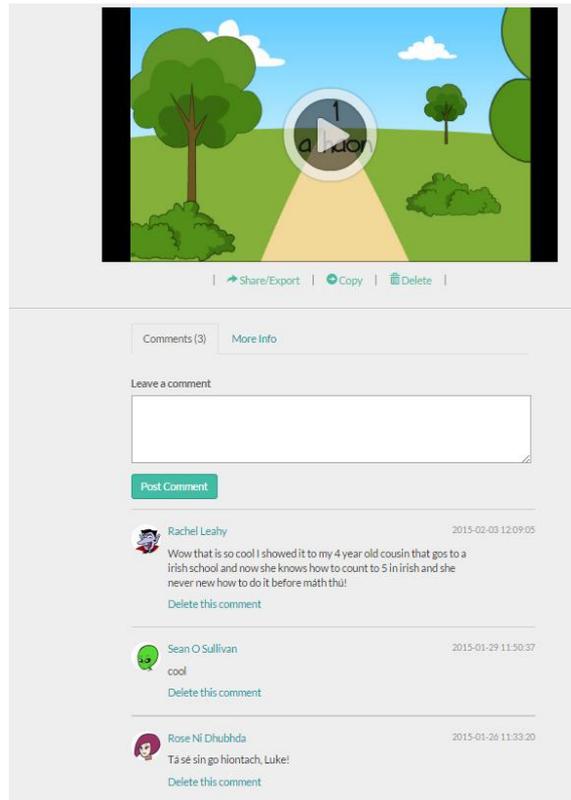


Figure 8.8: Students Interacting on Go Animate

John created 28 animated stories at home, four of which were in Irish. The following example illustrates one of his animations. Even though it is only one scene and his spelling is not completely accurate, his written work is commendable, especially his use of the grammatical construct 'i mo' [in my].



Figure 8.9: John's Animated Irish Story Created Outside of Class

The following diagram depicts another one of his Christmas Irish animations in tabular format. His grasp of grammar and use of vocabulary are exemplary.

Table 8.5: John's Animated Irish Story Created Outside of Class



8.5 MODIFICATIONS INFORMING ITERATION THREE

Emerging from our analysis of this iteration, the teacher and I executed the following modifications to our design in relation to our language activity and in response to technical concerns that had arisen during this iteration.

8.5.1 LANGUAGE ACTIVITY

While students argued less in similar-ability groups, more learning occurred in mixed groups. We decided to maintain our mixed ability configuration going into our next iteration. While whole-class instruction was the preferred approach in language classrooms around Ireland, group learning was employed by 26% (n=116) of teachers in 'almost all' lessons with mixed ability configuration being the preferred approach (National Teacher Questionnaire, 2015). One respondent commented: 'I would generally use mixed ability groups as the children can help each other, particularly in reading circles when the teacher cannot get to each child'.

Interestingly, 73% (n=328) of teachers 'never or almost never' engaged in interest grouping and 44% (n=199) 'never or almost never' engaged in streamed or ability grouping. One respondent stated: 'I do not agree with ability grouping. Children are highly sensitive to this and will immediately perceive themselves as "no good at Irish" if they think they have been put in a lower group. Then they stop trying and tune out' (ibid).

The teacher believed it was easier to monitor student engagement and learning as they worked individually, questioning them about a segment of writing or their choice of image or sound track. She felt it was 'hard to gauge who contributed what to the finished product in group work' (Interview 2). We decided to make this more explicit in the third iteration, questioning students on their storyboards and their design choices, ensuring they all contributed and understood the story content. We also decided to introduce question-time at the end of student presentations embedding learning at a deeper level. It would provide other students and the teacher and I with an opportunity to inquire about language content and technology functions encapsulated within their animated stories. Furthermore, to encourage greater engagement with the Irish language outside of class, we decided that only those students who created Irish animations at home could present in class.

8.5.2 TECHNICAL CONSIDERATIONS

As students became more adept at creating animated stories, we decided to introduce coding as another approach to constructing animated stories in Irish. This would incorporate and extend their previous skillset around storytelling technology tools and challenge them in their digital creations. In this way, student engagement in learning would be maintained. We also decided that students should be able to move onto the digital recreation phase of the activity once they completed their storyboards, thus facilitating more able students:

From my observations and time transcribing, I notice that some students complete their storyboards within 25 minutes. Even if they got half an hour on GA on Wednesdays, it would give them a great start (Email Correspondence to the teacher, Rose).

We attended a conference hosted by the Computers in Education Society of Ireland (CESI⁵⁴) midway through this iteration. From several discussions with other educators that day, the teacher became interested in pursuing digital badges as a way to encourage our students to speak more Irish.

We definitely have to try and get them to speak more. I kind of find kids coming up saying, even if they use some English, like, say Aileen came up to me today saying "do junior infants know seacláid"? You know, using a bit of Irish, I guess, which is great (Teacher, Interview 2).

Digital badges are similar to scouting badges (Sharples et al., 2012) and are described in the following chapter.

8.6 CONCLUSION

In this chapter, I described my observations from our second design cycle. I explored the potential of animated storytelling activities in Irish-language learning, modifying TALES in the process and informing the design of our third and final cycle. The following chapter discusses this capstone cycle in detail where we incorporated Scratch, a programming tool for young children, into our storytelling process.

⁵⁴ www.cesi.ie

9 CHAPTER NINE: DESIGN CYCLE THREE (CAPSTONE)

9.1 INTRODUCTION

This chapter describes the third and final design cycle of our instructional intervention. This capstone iteration unfolded over a ten-week period between mid-February and late May 2015. We maintained our focus on animated stories but introduced another application called Scratch, where students coded their stories. This design cycle therefore explored the potential of coding as a tool to facilitate Irish-language learning. Students experienced greater technical challenges as the learning curve was much higher for Scratch compared to previous tools. Informed by the previous cycles, this cycle resulted in greater language learning gains and engagement occurring both inside and outside of the classroom. Students became more confident in writing their stories and more capable in their use of technology tools. We also introduced a digital badge reward system in order to acknowledge student achievements in language.

9.2 INNOVATIVE LANGUAGE LEARNING ACTIVITIES

As per the previous design cycles, the teacher delivered the pre-communicative and post-communicative phases of each two-week Irish lesson and together we implemented the communicative storytelling phase. Students coded their animated stories using Scratch. For this study, I operationally define a successful coded animated story as one that is constructed upon a solid storyline, encompassing four scenes that are logically linked and where the story integrates voice, text, images and motion. Appropriate backgrounds, characters (sprites), music and audio effects are included to reveal context and enhance meaning. Coded animated stories reflect curricular content and demonstrate correct semantic, morphological and syntactical use of the language. Students created 235 coded animated stories in total – 58% (n=137) of their stories were in Irish, 26% (n= 60) were in English and 16% (n=38) were in another language or contained no language identifiers. One hundred and four stories were created outside of class, where 40.4% (n=42) were in Irish, 40.4% (n=42) were in English and 19.2% (n=20) were in another language or with no language signifiers. In the following sections, I describe Scratch as a technology and

learning tool, and then discuss the storytelling process involved in creating coded animated stories.

9.2.1 IRISH LESSON STRUCTURE

Each two-week lesson followed a similar pattern to design cycles one and two. As before, the teacher and I employed short bursts of instruction and ‘talking points’, where we presented our animated story and focused on key language and technology points. In week one, dyads of students completed a storyboard and on the second week they coded their animated stories collaboratively in groups of three. Each lesson was conducted through the medium of Irish and English translations were given only when requested. On alternate weeks, we either demonstrated a storyboard activity or a particular technology feature, incorporating and building upon student queries, ideas and input. We also implemented some changes to address concerns that had arisen in the previous iteration and are discussed in the following sections. Firstly, I provide a brief description of Scratch and its role in constructionist learning, as well as incorporating opinions from my questionnaire respondents in terms of using Scratch in the classroom. The diagram below illustrates our approach to our Irish-language learning activities in our final iteration.

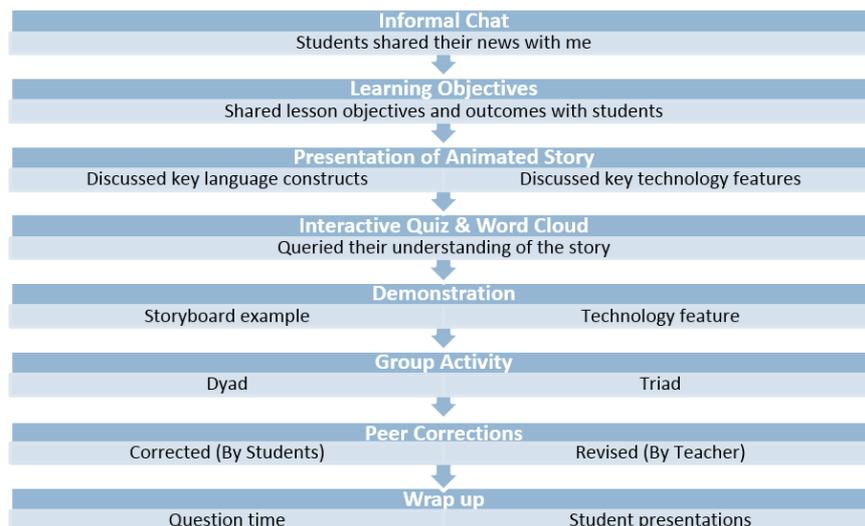


Figure 9.1: Irish Lesson Structure

9.2.2 SCRATCH

Scratch is a free visual programming language for children and was developed in 2007 by the Lifelong Kindergarten research group at the MIT Media Lab (Brennan & Resnick, 2012). It can be downloaded as a standalone application or it can be accessed online via a web application. Scratch is predicated upon a constructionist learning philosophy (Roque et al., 2016) where students can engage in the construction of digital learning artefacts or objects-to-think-with (Papert, 1993b). Like the previous technology tools, its programming environment enables children to collaboratively create animations and interactive stories incorporating images and audio (Resnick, 2012; Roque et al., 2016). Scratch has grown into a ‘vibrant community with more than 15,000 projects shared every day, by young people all around the world, primarily between the ages of 8 and 16’ (Roque et al., 2016, p. 242).

Scratch is made up of graphical blocks representing a host of commands such as motion, interaction and audio (Brennan & Resnick, 2012). They can be dragged from the block palette to the stage and snapped together into scripts much like LEGO bricks or jigsaw puzzle pieces (Brennan & Resnick, 2012; Resnick, 2014; Resnick & Rosenbaum, 2013). These blocks will only snap together if the combination of block shapes makes sense, however (Maloney et al., 2010; Resnick & Rosenbaum, 2013). Each sprite needs a script to control its behaviour (Resnick & Rosenbaum, 2013) and Scratch uses a broadcast block to support 'inter-sprite communication and synchronization' (Maloney et al., 2010, p. 11). As with GA, it comes bundled with a large library of media such as background images, sound effects and music loops (Maloney et al., 2010; Resnick & Rosenbaum, 2013). It has a built-in audio recorder, but unlike GA, it also has its own built-in paint editor for creating and editing images. Finally, it has a multi-language environment where a global network of volunteers translated it into more than 40 languages, including Irish (Resnick, 2012).

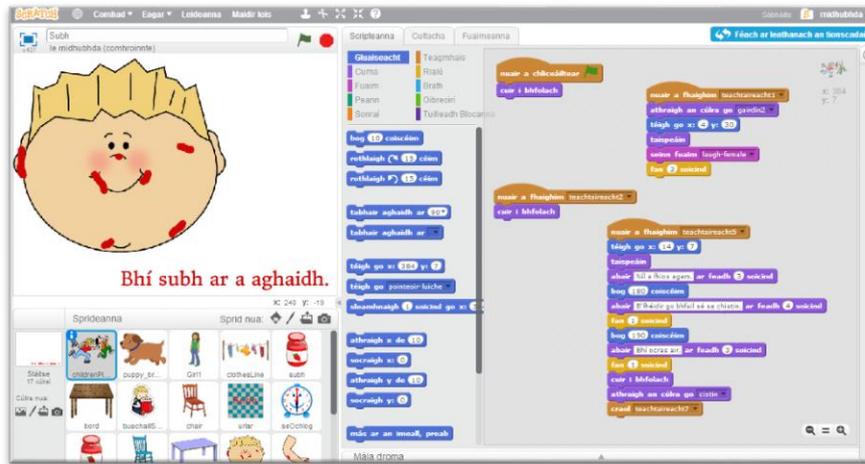


Figure 9.2: Scratch's Interface

Scratch is an open source version of Logo – a programming language for children that was co-developed by Papert in the late 1960s (Martinez & Stager, 2013). Logo, in turn, was based on a simplified version of Lisp, an artificial intelligence programming language (O'Shea and Koschmann, 1997). Logo was difficult to use, however, as many children found the syntax too challenging (Resnick et al., 2009). Gros (2002) felt that many of Papert's approaches to using Logo in the classroom were interesting, but lacked 'realism in terms of use in normal learning contexts' (p. 332). Compared to Logo, Scratch is exceptionally quick to learn and 'users can be programming within fifteen minutes' (Maloney et al., 2010, p. 14).

It supports progressive learning as students move from simple to advanced programming features and therefore has 'enough depth and variety to keep users engaged for years' (ibid), scaffolding students' learning as they programme more complex creations over time. Students worked with five of the seven computational concepts in Scratch, including sequences (a set of instructions to activate a behaviour); loops (running a sequence multiple times); parallelism (sequences happening at the same time); events (one event causing another event) and conditionals (activating a sequence once a condition had been met). Due to time constraints, operators (numeric and string manipulations) and data (variables and arrays for storing, retrieving and updating values) were not employed in this study.

Sixty percent (n=269) of my questionnaire respondents were open to the idea of their students creating Irish animations using Scratch. Several teachers worried about their own technical abilities, however: 'I find this programme difficult to use' and many emphasised the need for more training in Scratch and for more time to be allocated to such activities within the curriculum. Some teachers indicated that they were already using it: 'my pupils love scratch!', 'we're doing mini conversations in pairs using Scratch', 'we make animations in Scratch anyway so including Gaeilge would be no problem' and 'we constructed short stories in English last year, it was very useful for sentence construction', 'children do things with Scratch that I could never teach them, wonderful tool' and 'Scratch is wonderful! Kids love it and it lends itself very well to Gaeilge'. Several teachers stated that they received training in Scratch but had not yet used it in their classrooms, with one teacher saying: 'I've done a course on Scratch and feel it offers an ideal opportunity to integrate problem-solving, teamwork, and developing Irish vocabulary'.

Some teachers believed, however, that it would be too difficult to integrate into an Irish lesson: 'Scratch is slightly too difficult for children to come to terms with in third class in English let alone do it through Irish', 'No problem with Scratch but I think it would be extremely ambitious to teach it as Gaeilge' and 'I would worry that it would be difficult to maintain teaching through Irish using Scratch. I am also not sure if I would personally have the vocabulary to explain the operations of Scratch through Irish'. Others saw no value in this approach: 'Our main focus is that children can speak and read Irish with a degree of fluency when they leave school. Sometimes, this sort of activity, while of great value, can impinge on the progress of learning in other areas' and 'The DES has increased the amount of time spent on literacy & numeracy and focus in raising standards in these areas. They have no interest in Gaeilge at the moment. My interest in the language is at an all time low. We cannot be expected to serve all interest groups'.

9.2.3 INTRODUCING SCRATCH TO STUDENTS

It took more time to introduce students to Scratch compared to GA and LBT. The latter two applications required minimum instruction to enable students to use them effectively in the classroom, LBT in particular. Scratch required students to understand key coding features as well as basic design elements, which they had learnt in the previous two cycles. We first determined the features and functionality most pertinent to our storytelling process. These included:

- Scene (background) and character (sprite) design;
- Text bubbles for statements and thoughts;
- Audio recordings for narration;
- Motion for animation; and
- Broadcasting and receiving messages between sprites and backgrounds.

Students engaged in four free play sessions (six hours over a two-week period), twice the time given to other applications. We introduced a minimum skill level each week through short instruction bursts around story and encouraged them to tinker with Scratch during this time. We also designed Irish posters of common Scratch blocks and hung them on the classroom walls. The learning objectives for the first week included:

- Add a background;
- Add two sprites;
- Add text (getting a sprite to say/think something);
- Add audio; and
- Add motion (sliding and steps).

The learning objectives for the second week included:

- Change sprite costumes;
- Change backgrounds; and
- Broadcast and receive messages between sprites.

The teacher naturally took the lead in this iteration and demonstrated the basic features of Scratch to the students in the computer room. Following on in the classroom, she called upon several students to demonstrate the various programming features that they had discovered earlier on in the computer room. Even though Scratch has built-in help screens for every command, our students never needed to

use them as they learned about commands by tinkering with them and, in the process, they quickly learned more complex concepts (Berland et al., 2013).

The remaining eight weeks of this iteration involved four storyboard activities and four digital recreation activities. We approached our digital recreation activities in an incremental manner (Brennan & Resnick, 2012), testing and debugging segments of code as we designed them. This process is known as troubleshooting, where students find and correct errors that 'keep the program from working' (Papert, 1993b, p. 23). Clicking on each sequence of blocks shows you its behaviour immediately, eliminating extra steps for compilation of code required by most other programming languages (Resnick & Rosenbaum, 2013). This live feature (Maloney et al., 2010) was not available in GA and LBT as both previewing and publishing functions took time and required leaving the design space. Once dyads of students completed their storyboards, triads of students programmed their animated stories. The following illustrations convey the process for one group of students. Interestingly, the story below is longer and reads more fluently compared to stories from previous iterations. It is called 'Lá sa Pháirc' (A Day at the Park) and is written in the past tense. It has a good storyline and they make great use of their vocabulary and verbs, as well as being grammatically correct.



Figure 9.3: Storyboard Activity

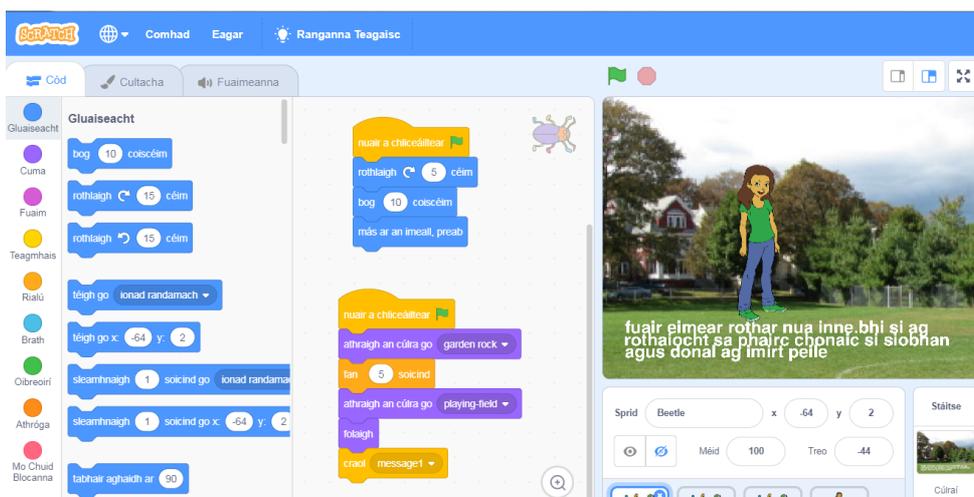
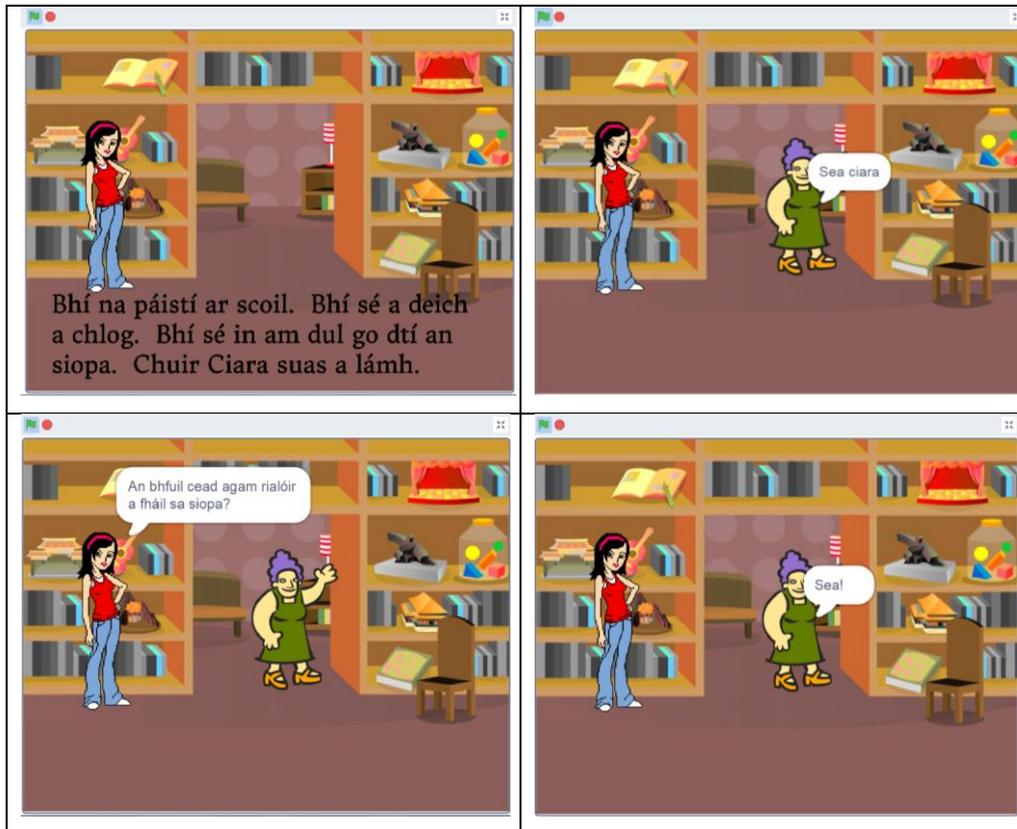


Figure 9.4: Digital Recreation Activity

The following illustration describes another animated story and reveals the script students wrote to create it. In addition, their Irish story is very well-written and relates to the theme concerning school.

Table 9.1: Coded Animated Story Completed by Group



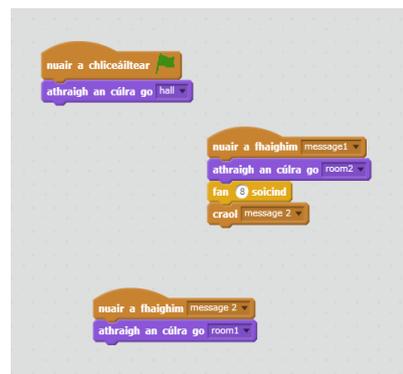
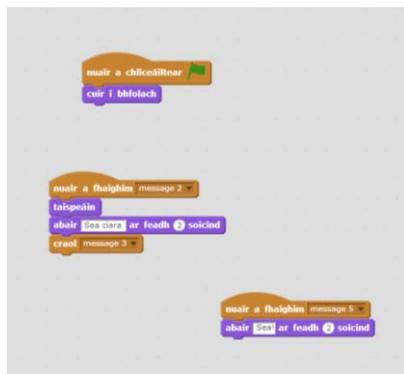


Figure 9.5: Scratch Script Created by Students

9.3 TWEAKS MADE TO ITERATION THREE

We felt our second design cycle had stabilised somewhat as we neared the end, and as a result, less modifications were required in this cycle. In addition to introducing students to a new technology tool, we implemented digital badges as a means to encourage students to speak more Irish in the classroom. To ensure that all students were learning, we questioned them as they worked. We also introduced question-time after they presented their stories to query language and technical aspects pertaining to them. Furthermore, we enabled early finishers of the storyboard activity to move onto the digital recreation activity as soon as they completed their stories. They first had to go through the process of peer corrections and teacher review, however.

9.3.1 SUSTAINED ENGAGEMENT THROUGH TECHNOLOGY VARIATION

Technology often motivates students to engage in their learning due to it being novel, but this motivation may not be sustained over time (Higgins et al., 2012). Sandholtz et al. (1994) investigated the long-term impact of technology on student engagement in order to dispute this novelty factor. They noticed that when ‘software programs were used repeatedly, they became routine and boring’ (Sandholtz et al., 1994, p. 15). O’Brien & Toms (2008) found this to be the case too as students' interest in technology diminished as the weeks progressed. I also observed this in our students' interactions with technology as our previous two iterations drew to a close. I therefore introduced a new, more challenging technology with each cycle in order to sustain student engagement. In pushing the technology learning curve in this way, students became more cognitively connected to their learning activities as they tinkered and explored tools. In addition, their language skills were continuously and naturally being challenged with the introduction of new curricular themes and grammatical constructs. When learning develops in tandem with challenge level, the flow experience remains the same during the learning process as ‘skills have risen and challenges have been met thus resulting in accomplishment of tasks at hand’ (Pilke, 2004, p. 348). Learning activities became more demanding with each subsequent iteration, maintaining flow in students' learning. Our objective for each iteration, therefore, was to challenge students with ‘increasing degrees of difficulty’ (Applefield et al., 2001, p. 45) in both language and technology learning; to enable the transfer of learning from one iteration to the next; and to build on this learning with each subsequent iteration.

9.3.2 DIGITAL BADGES

Sharples et al. (2013) define badges as a reward for ‘achieving a set level of knowledge of a topic’ or for demonstrating a ‘particular level of competency in an activity or skill’ (p. 12). They promote extrinsic motivation in learning by documenting, acknowledging and assessing students' learning activities and gains, and can therefore lead to increased engagement (ibid). Each badge appears as an image and outlines a particular learning objective and level achieved, providing students with visual progress of accomplishments.

The digital badges designed for this study embodied three of the six language functions fostered in the Irish-language primary curriculum (NCCA, 2013):

- Engage in social interaction (caidreamh sóisialta a dhéanamh);
- Give and ask for information (eolas a thabhairt agus a lorg); and
- Request clarity during a conversation (soiléiriú a lorg i gcomhrá).

The digital badge reward system was a group effort involving the students, the teacher and I. Our students played a very important role in providing us with information in terms of the type of rewards that would motivate them to learn and how they envisioned a digital badge to look. Their opinions were gathered through two student quizzes, focusing on what would motivate them to learn in general and what would motivate them to learn Irish in particular. We found that 96% (n=26) of students enjoyed getting rewards in class and 70% (n=19) of them felt rewards incentivised them to work harder. Rewards included (in descending order of preference): homework passes; being chosen to run an errand; praise; computer time; and tweets about their work. Medals and trophies were the most popular rewards achieved outside of school. In terms of Irish, 85% (n=23) of students said they liked speaking in Irish and 63% (n=17) believed that a reward system would encourage them to speak more Irish.

We explored several software options for designing and hosting badges. We decided on an online application called Class Badges⁵⁵ to manage our reward process as it was easy to set up and implement in the classroom, and it did not need student email addresses. Its functionality was limited, however, in that it was difficult to visualise students' achievements graphically and individually. We designed a badge-issuing scheme, incorporating six levels, where students would earn badges for:

1. Answering a teacher's question (múinteoir a fhreagairt);
2. Asking a teacher a question (ceist ar mhúinteoir);
3. Asking a fellow student a question (ceist ar dhalta);
4. Answering a fellow student's question (dalta a fhreagairt);
5. Speaking with a fellow students (comhrá idir dhaltai); and
6. Special achievement award (gradam gaisce).

⁵⁵ www.digitalbadges.com

Each badge had the same shape and symbol but a different colour indicating a particular level. We also included metadata to describe the target level achieved, the learning objective, the recipient's name and date. The teacher trialled our reward system during Seachtain na Gaeilge⁵⁶ (Irish Language Week) before implementing it in our Irish lessons.

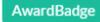
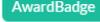
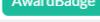
	Leibhéal 1	Múinteoir a Fhreagairt as Gaeilge	0			
	Leibhéal 2	Ceist ar Mhúinteoir as Gaeilge	0			
	Leibhéal 3	Ceist ar Dhalta as Gaeilge	0			
	Leibhéal 4	Dalta a Fhreagairt as Gaeilge	0			
	Leibhéal 5	Comhrá Gaeilge idir Dhaltai	0			
	Leibhéal 6	Gradam Gaisce Gaeilge	0			

Figure 9.6: Digital Badges Scheme

We found that digital badges motivated students to speak more Irish in class. Prior to this, they mostly spoke in English to us and amongst themselves as they created their Irish digital and animated stories. They were more eager than usual to speak Irish and competed with one another to gather as many digital badges as possible. Students were even tweeting me in Irish and leaving comments in Irish on Scratch for other students:

Caithfidh mé rud éigin a rá! Bhí Áine ag caint liomsa as Gaeilge ar Twitter inné. Scríobh sí cúig tvuít chugam as Gaeilge. Agus d'fhág Rita cúpla nóta tráchta, or comments, as Gaeilge ar Scratch le haghaidh daoine eile sa rang seo (Rose). [I have to say something! Áine was tweeting me yesterday. She sent me five Irish tweets. And Rita left some Irish comments for others on Scratch]

⁵⁶ An international Irish language festival and one of the biggest celebrations of Irish language and culture <https://snag.ie/>

The teacher was especially positive about the impact of digital badges on student learning: 'I think it has great potential to boost learning in the class, but it probably needed to start earlier in the year' (Interview 3). She also saw their potential in terms of our digital recreation activities:

You could probably tie badges into merits with language firstly but also merits with IT, so that you got your Little Bird Tales badge, you got your Go Animate badge, you got your Scratch badge. And it's a great way of maybe communicating them to home as well (Interview 3).

In the following vignette we see the effect of digital badges on students as they motivated them to answer our questions in Irish. They also spontaneously share other pieces of information with us in Irish. Quieter students such as Rita and Ruth R engaged in our group conversation. They would normally sit silently during such exchanges. In the following example, I asked the students about how they celebrated St. Patrick's day:

Rose: Lá le Pádraig a bhí ann inné [It was St. Patrick's day yesterday]! Cad a rinne sibh [What did you do]?

Cian: Ní raibh mé ag siúl sa pharáid [I wasn't walking in the parade]. Bhí mé ag féachaint air [I was watching it].

Rose: An raibh an pharáid anseo nó an raibh sé sa chathair [Was the parade here or in the city]?

Cian: Am, sa chathair [In the city].

Rose: Sa chathair, go maith [In the city, very good].

Rita: Tá mo bhreithlá amárach [Tomorrow is my birthday].

Rose: Á, go hiontach [Wonderful]! Lá breithe sona dhuit [Happy birthday to you]! Agus cén aois a mbeidh tú [How old will you be]?

Rita: Deich [Ten].

Rose: Deich mbliana [Ten years old]. Ana chailín [Good girl]. Bhuel, tá súil agam go mbeidh ana lá agat amárach [Well, I hope you will have a great day tomorrow]!

John: Shiúil mé sa pharáid [I walked in the parade].

Rose: An raibh tú gléasta suas [Were you dressed up]?

Teacher: Le rugbaí nó iománaíocht [With rugby or hurling]?

John: GAA [football].

Rose: Le GAA, go maith [With football, very good]! Jack?

Jack: Tá mé ag siúl sa pharáid freisin [I am walking in the parade too].

Rose: Bhí tú ag siúl sa pharáid [You were walking in the parade]! Le cé hé, leis an GAA nó leis an rugbaí [With football or rugby]?

Jack: Sacair [Soccer].

Rose: Leis an sacair, maith thú [With soccer, well done]! Éinne eile [Anybody else]?

Rose: B'fhéidir go seinnfidimid é seo anois agus ansan tosnóimid ar Scratch [Maybe we'll play this and then start Scratch]. An bhfuil sé sin ceart go leor [Is that ok?]? [*Ruth R has her hand up*]

Rose: Ruth?

Ruth R: Siúl mé inné [I walked yesterday].

Rose: Shiúl tú [You walked]! Cailín maith [Great girl]!

In another exchange between students working on their first storyboard, one student encouraged another to speak in Irish:

Ruth: My bedroom looks nice.

Cian: You say 'seomra codlata' [bedroom].

In our final digital session, we presented the special achievement badge to one student for his efforts in speaking Irish during this cycle:

Rose: Agus an cuimhin libh na boinn Ghaeilge [Do you remember our digital badges]? D'éirigh go hiontach le gach duine agaibh, bhain sibh go léir leibhéal a ceathair amach [Everyone did so well, you all reached level four]!

Voices: Yay!

Rose: Ach sheas duine amháin amach go mór [But one student stood out in particular]. Rinne sé iarracht mhaith Gaeilge a labhairt linn agus libhse an t-am go léir [He made a great effort speaking Irish to us and to you].

Fionn: Séamus!

Larry: Sammy!

Rose: Táim ana-bhrodúil asat, Séamus [I am very proud of you Séamus]! Táim brodúil as gach duine agaibh [I'm very proud of everyone of you]. Agus táim chomh buíoch as an mbliain seo a chaitheamh libh [And I am so grateful that I got to spend this year with you]. Bhí an t-ádh liom agus mhúin sibh ana chuid dom [I was very lucky and you taught me a lot]!

9.3.3 STUDENT PRESENTATIONS

Eighty eight percent (n=23) of students enjoyed sharing their stories with the rest of the class, with one particular student stating: 'I love hearing the stories and I like presenting them' (Student Questionnaire 2). As per the previous cycle, students presented their own Scratch stories at the end of class but only the Irish ones they created at home. We also introduced question-time, where the students, teacher and I could inquire about the code segments and language structures they employed in their animations. This required students to articulate their coding and describe their scripts in Irish, thereby deepening their understanding. We also asked them questions about their stories. In the following exchange (our final free play session), George and Séamus showed their game to the class. Students were very focused on the IWB. My notes indicate from that day that: 'I opened their scripts on the IWB and drilled down into them, asking them questions about their code, in Irish! They understood me and answered me in Irish!' Séamus presented their story and discussed the code they used to create it:

Teacher: Clic ar an mbrat glas, clic, ana-mhaith [Click on the green flag, click, well

done].

Rose: Só abair linn [So tell us], JS Games Ltd [*their company name*]. Cad a rinne sibh leis an gcluiche seo a chruthú [How did you create this game]?

George: We had to use the blocks and the purple ones and Séamus will explain cos [*Séamus did most of the work*]

Rose: Séamus, ar mhaith leat é a rá linn [Would you like to tell us, Séamus]?

Séamus: We used the forever command, go deo [forever].

Teacher: Ana-mhaith.

Séamus: We clicked on mouse pointer and then am...

Rose: Téir suas agus taispeán an cód dúinn [Show us your code on the board]. Nuair a chliceáiltear, téir chuig X, an ea [When clicked, go to X, is it]?

George: And we had to put in 00 [*coordinates*].

Teacher: Ana-mhaith. Tosnú anseo [Well done. Starting here] [*she points to the centre of the board*].

Rose: Tosnaigh sa lár agus abair 'Grrrr', is maith liom fuil [Start in the middle and say 'Grrr' I like blood]! Agus ansin úsáideann tú an lúb [And then you use the loop].

Rose: Is maith liom fuil [I like blood]. Cad é sin as Béarla [What does that mean in English]?

Naoise: Is maith liom 'blood'.

George: He wants Winky's [*character in game*].

Rose: Is maith liom fuil. OK. D'úsáid siad lean an pointeoir luchóige [They used the follow mouse pointer]. Follow the mouse pointer. Jab maith, a bhuachaillí [Good job boys]!

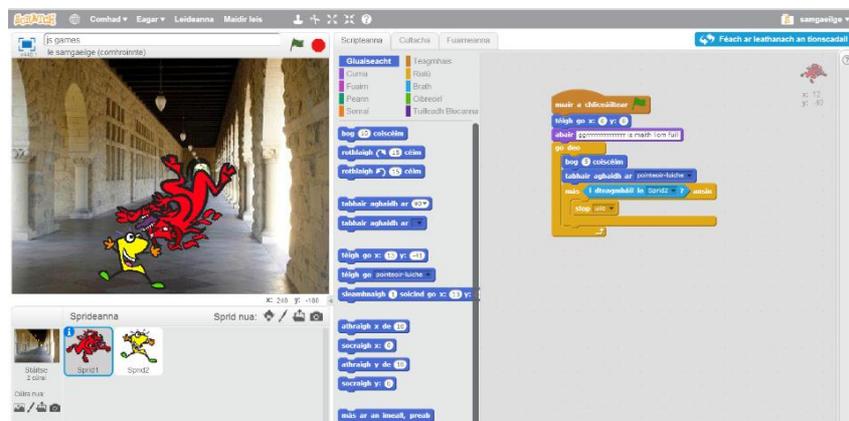


Figure 9.7: Scratch Code

9.4 OBSERVATIONS FROM ITERATION THREE

The following section describes my main observations from this iteration and the subsequent modifications implemented as this iteration unfolded. As per the previous iterations, they relate to language, our learning activity, technology and engagement, all grounded in my set of design conjectures and requirements outlined in chapter 6. To recap, they include fostering language-in-use in an integrative, communicative, meaningful way; the pedagogical application of technology using coded animated storytelling; and the promotion of collaborative learning through scaffolded instruction and peer learning.

9.4.1 LANGUAGE IN USE

This section looks at how we further immersed our students in the Irish language and shows examples of students' learning gains and enhanced attitude towards the language.

9.4.1.1 IMMERSION

In addition to maintaining our immersive approach to language learning, students worked with localised technology. Scratch's interface was available in Irish, resulting in students interacting with command blocks and design features through the medium of Irish. Furthermore, students could only present the animations they created at home if they were in Irish. We also introduced digital badges to motivate students to speak more Irish. They had a positive effect on their language use as the teacher confirms in our third interview: 'I feel that our reward system is working well. Students are really giving it a go and working hard on speaking more Irish in class, at least 50% of them' (Interview 3). Her own level of fluency also improved over the course of this year. For example, the teacher explains our digital badges system to the students. She does this through Irish without ever translating to English:

Má thugann sibhse freagra dom i nGaeilge, bronnfaidh mé bonn leibhéal a h-aon duit [sic]. Má chuireann tú ceist orm i nGaeilge, sin an bonn do leibhéal a dó. Agus má cuireann tú ceist ar dhalta eile sin leibhéal a trí. Má freagraíonn tú an dalta i Gaeilge, sin leibhéal a ceathair. An cúigiú leibhéal is ea comhrá. Sin an t-am nuair a bhíonn daoine ag caint le chéile i nGaeilge. Agus an Gradam Gaisce, sin an leibhéal is airde, sin leibhéal

a sé. Beimid ag éisteacht! [If you answer me in Irish, I will give you a badge for level one. If you ask me a question, I will give you a badge for level two. And if you ask another student, that's level three. If you reply to a student in Irish, that's level four. The fifth level is conversation, that's when you speak together in Irish. The special achievement award is level six. We'll be listening!]

9.4.1.2 LANGUAGE LEARNING

The teacher noted an improvement in their spoken Irish and in their frequency in speaking it:

They are using way more spoken Irish, even outside of Irish class they're using phrases like 'feicfidh mé amárach thú' [See you tomorrow] and 'bain taitneamh as an lá' [Enjoy your day]. I think they have a better idea of sentence structure as well, they are way better at knowing to start with a verb and not starting everything with 'tá' all the time (Interview 3).

They also made more of an effort to speak Irish to each other. The following exchange during our first technology session illustrates this:

Seosamh: We're looking for a daidí [daddy]. Look for an old person.
Seosamh: No, he's too styled.
Ruth: No, buachaill a trí [boy number three].
Rose: Seosamh, is féidir libh é a dhéanamh níos mó, é a mhéadú [You can make him bigger, enlarge him].
Seosamh: Sure for the mamaí [mom], we can do cailleach gránna [ugly witch]. Ha!
Cian: Grab him and make him larger.
Seosamh: Buachaill a trí, am, cool. Cian! Buachaill a trí.
Cian: Tá siad ag déanamh, tá siad ag siúl [They are doing, they are walking].
Seosamh: Yeah, tá siad [they are].
Cian: Sa seomra codlata [In the bedroom].
Seosamh: Is that daidí, is that daidí, am, ag siúl [Is that daddy walking]? Tá daidí ag siúl [Daddy is walking].
Cian: Yeah.

Later, I overheard students attempting to use some Irish as they created their animated story:

Séamus: How do we make them 'eitilt' [fly]?
Amy: Oh, I don't know how to make them fly.

After our first storyboard session, some students came up after class to thank us in Irish and to tell me how they now liked speaking in Irish:

Séamus: Go raibh maith agat, a mhúinteoir. Go raibh maith agat, Rose.

Rose: Fáilte romhat Séamus!

Áine: Is maith liom ag caint as Gaeilge anois!

Rose: Tá áthas orm é sin a chloisint!

This is in contrast with observations another teacher shared with me in an interview as part of my questionnaire study. He noted how his third class students did not engage in conversation in Irish but based on his experience, that they would be by fourth class:

Níl rang a trí ag caint liom fós...ach beidh siad, ach tá Rang a Ceathair ag labhairt...Tá siad ag teacht isteach air. Só, tá mé ag ceapadh nuair a bheidh siad i Rang a Ceathair, beidh siad in ann labhairt liom [Third class students are not yet talking to me in Irish, but they are getting there. They will be by fourth class] (Henry, 2015).

Students' story writing skills greatly improved also. In email correspondence with the teacher after our second storyboard session, she wrote: 'They have gotten much better and much faster at this. Just looking at their storyboards here, loads of them got 'sa + h' correct! Success!' (Teacher, 25/03/2015). Comparing this to her observation in iteration two where she stated: 'Like when we did 'sa' taking a 'h'. For some reason they find that very hard to remember and a lot of kids get that wrong when it comes up in class' (Interview 2). As the intervention progressed, students were further exposed to the language and through their story writing process, they moved from the abstract to the concrete (Shaw, 1996) as they used this construct, 'sa + h', in a more meaningful way. Later in the iteration, she once again remarked upon their overall improvement in their story writing skills:

We've always had the few good writers, but this week they've really all stepped up. Every story was excellent. Even the stories from students that struggle the most, they all had original well-written stories. They were excellent! (Interview 3).

Their listening and comprehension skills have also improved. The following dialogue between the students and I at the beginning of our third storyboard session depicts this. I ask them some questions about my Scratch story, not only do they understand me, they reply in Irish. I also notice that I do not have to prompt or repeat any of my questions:

Rose: Cian? Cad a tharla do Neasa [What happened to Neasa]?
Cian: Am, thit Neasa ar an talamh [She fell on the ground].
Rose: Conas ar thit sí ar an talamh [How did she fall on the ground]? Jack?
Jack: Thit sí ar Jack [She fell on Jack].
Rose: Ó, bhuaíl sí isteach i Jack [She ran into Jack]. An rabhadar ag rith nó ag siúl nó ag...John [Were they running or walking or...]?
John: Ag scátáil [Skating].
Rose: Ag scátáil, go maith. Agus an raibh Neasa ag gol [Was Neasa crying]? Dáithí?
Dáithí: Tá [Yes].
Rose: Yeah, do bhí Neasa ag gol [Neasa was crying]. Agus cad a dúirt Jack le Neasa [What did Jack say to Neasa]? Rita?
Rita: An bhfuil tú ceart go leor [Are you ok].
Teacher: Ana-mhaith, Rita!
Rose: Carragh? An raibh glúin Neasa tinn [Was her knee sore]?
Carragh: Tá [Yes].
Rose: Séamus! An raibh glúin Neasa ag cur fola [Was her knee bleeding]?
Séamus: Am, tá glúin, am, Neasa ag cur fola [Her knee is bleeding].
Rose: Maith sibh [Well done]!

Here I checked in with students during our third storyboard session. They responded to my questions in Irish without any hesitation:

Rose: Conas atá ag éirí libh [How are you getting on]?
John: Go hiontach [Great].
Rose: An bhfuil sibh críochnaithe [Are you finished]?
John: Ní fós [Not yet].
Rose: An bhfuil aon chabhair uaibh [Do you need any help]?
Fionn: No, níl [No].
Rose: Cad a tharla don ghloine [What happened to the glass]?
John: Am, thit sé ar an úrlár agus tá daidí ag teacht [It fell on the floor and daddy is coming].

The following exchange further demonstrates their enhanced comprehension skills. During our second free play session in the classroom, the teacher delivered a short demonstration in Irish on creating an animation using Scratch. She showed them how to change backgrounds and sprite costumes, and how to add text, audio and motion. She stood at the IWB, directing Séamus as he sat at her computer entering the text and coordinates for her. The teacher's fluency is also noteworthy:

Teacher: Tá sé ag bogadh. Cas cúig déag céim, bog 10 cóisceimeanna, agus más ar an imeall, preab. Más maith leat, Séamus, ciorcal níos mó a dhéanamh, b'fhéidir, cuir isteach fiche coiscéim. [He is moving. Turn 15 degrees, move 10 steps, and if on the edge, bounce. If you like, Séamus, draw a bigger circle, may enter 20 steps]

Teacher: Só, fan, b'fhéidir soicind, agus athraigh go dtí an chéad chulaith eile. Só A agus ansin B agus ansin C agus ansin D agus ar ais go dtí A agus B agus C. Anois, féach an bhfuil sí ag damhsa, Séamus, brúigh an brat glas. Féach ar an 'ballerina' ag rince. [So wait one second and change to the next costume. So, A and then B and then C and then D and back to A and B and C. Now, see if she's dancing, Séamus, press the green flag. Look at the ballerina dancing]

Séamus: Ó!

Teacher: Clic arís ar an mbrat glas. Féach ar an ballerina. Só A B C D, A B C D. Tá sí ag damhsa, arís agus arís agus arís. Go deo. [Click on the green flag again. Look at the ballerina. So A B C D, A B C D. She is dancing again and again and again. Forever]

John: Class!

Teacher: Ba mhaith liom an cúlra a athrú. Só isteach i Scripteanna ar an stáitse, Séamus. Is maith liom an gairdín ar dtúis ach ba mhaith liom athrú go dtí cúlra eile [*the teacher holds up our Irish poster for this code*]. [I would like to change the background. Into Scripts on the stage, Séamus. I want the garden first and then change to a different background]

Teacher: Roghnaigh an pháirc. B'fhéidir ceithre soicind, só fan ceithre soicind, scríobh isteach ceathair, Séamus. Maith an buachaill! [Select the park. Wait 4 seconds. Write in 4, Séamus. Great boy!]

9.4.2 LEARNING ACTIVITY

The teacher has adapted to our new instructional approach involving short instruction bursts and scaffolding approaches. Students have also adapted to this new way of learning where they work collaboratively, coaching and helping each other in the process.

9.4.2.1 INSTRUCTION BURSTS

Short instructional bursts were the norm. The teacher rarely slipped back into passively supplying information to students, but mostly questioned and prompted them as she instructed and built upon their input. In fact the only time I witnessed her transmitting information to students was during our first free play session:

Teacher: Agus cad a dúirt sé [What did he say]?

Séamus: Am...

Teacher: B'fhéidir ahhhh [Maybe ahhhh]?

Lisa and Séamus: Yeah!

Teacher: Agus abair 'Go bhfóire Dia orainn' [And say 'God help us']!

Séamus and Lisa: Yeah!

Teacher: OK, só an bhfuil sibh réidh [Are you ready]? Seinn an fhuaim agus taifead do ghuth [Press play and record your voice]. Cad a deireann sé [What does he say]?
Séamus: Ahhhhhh! Go bhfóire Dia orm!
Teacher: Ana mhaith!

She employed short instruction bursts thereafter, for example in our second free play session in the classroom, she did a twenty-minute presentation demonstrating Scratch, drawing ideas from the students. She invited students to demonstrate what they had learnt in earlier sessions. Fionn showed the class how to record and add audio to a sprite and John demonstrated the sliding movement.

9.4.2.2 SCAFFOLDING

Even though this iteration was the most technically challenging, students were coding stories within two weeks with very little assistance from us. Building four sessions of free play into our design was key, however. Consequently, the teacher and I were mostly needed for support around language queries. At the beginning, however, students seemed a little overwhelmed by the technology. The following exchange during our second free play session, portrays us decomposing an activity into smaller, more manageable, steps:

Séamus: We're making up a game, he's the cheetah and he's going to chase him.
Rose: Ó! Táim ag súil leis an geluiche seo a fheiceáil [I'm looking forward to seeing this game]!
Séamus: I just hope, I hope we can. I hope we know how to move them around. I don't know how...
Rose: Tosnaigh le carachtar amháin ar dtúis, Séamus, agus cuir ag caint é. Ansan bog timpeall an stáitse é. Déan an rud céanna le do cheetah ansan [Why don't you start with one character first, Séamus, and see if you can make him talk. And then move him around the stage. And then do the same with your cheetah]
Séamus: Yeah, that's actually a good idea. First we start off with, am, the people, like how they talk and stuff.
Teacher: OK. Cad faoin stáitse? Cad faoi cúlra? Tá sé bán [What about the stage? What about a background? It's white].
Séamus: Oh, yeah, we need a background.

I later stepped in to help them with a translation for their game:

Rose: Cad é 'blood' as Gaeilge [What's blood in Irish]? Bhí sé againn le haghaidh Oíche Shamhna [We had it for Halloween].
Séamus: Blooda?
Rose: Ní hea [No]!
Séamus: Fo-il! Fu-il!
Rose: S'ea! Fuil [Blood]!
Séamus and George: Yay!

George: Fuil. F U
Séamus: I L.
Rose: Ana-mhaith. F U I L.
George: Yay!
Rose: Só, Grrrr! Is maith liom fuil [I like blood]! Úsáid an foclóir má bhíonn sibh ag long focail [Use the dictionary if you're looking for a word].

The following two vignettes illustrate scaffolding dialogues around grammatical constructs. I helped students work through their understanding of pronouns. In the second storyboard session, for example, we discussed the pronoun 'liomsa' and how to use it correctly in a sentence:

Séamus: What does 'liomsa' mean in Irish?
Rose: It means 'mine'. Só, is liomsa é seo. This is mine.
Séamus: No, that's not yours!
Rose: Tá's agam [I know]! Ní liomsa é sin [This isn't mine]!
Séamus: Liomsa an peann luaidhe [This pencil is mine].
Rose: S'ea [Yes]! Féach, liomsa an peann luaidhe seo agus leatsa an peann luaidhe sin [Look, this is my pencil and that is your pencil].
Séamus: Oh!

In our third storyboard session, I worked through the use of another pronoun with students:

Rose: An féidir liom féachaint air [Can I take a look]?
Rose: An bhfuil tú ocras (sic) [Are you hungry], arsa Warnado? Tá, arsa Bouncer [Yes]. Ok, só, an bhfuil tú ocras (sic), an bhfuil sé sin ceart [Are you hungry, is that right]?
John: Ar. Tá ocras air [He is hungry] [*John has chosen the correct pronoun*]
Rose: An bhfuil...
Fionn: ...ocras air.
Rose: S'ea, nach mór [Nearly].
Fionn: An bhfuil ocras ort [Are you hungry]? [*Fionn builds the question correctly*]
Rose: S'ea! An bhfuil ocras ort.

The ensuing exchange between the students and I illustrate our scaffolding approach around technology. In our fourth technology session, students wanted to copy code from one sprite to another in order to mimic a similar action:

John: We're trying to get that to come in on that side.
Rose: Só caithfidh sibh an píosa cóid a chóipeáil [You have to copy this piece of code].
Fionn: Copy this?
John: Yeah.
Rose: No, no! [*Jack clicks on the stamp tool*] Caillfidh tú é sin má dheineann tú é sin, Jack, is ionann é sin agus do chód a chur sa bhosca brúscair [You'll lose it if

you do that, Jack, that's like putting your code in the bin].
Fionn: Put in the bin?
Rose: Scriosann sé an cód [It deletes the code]. Teastaíonn uait é a chóipeáil [You want to copy it].
Fionn: Yeah.
Rose: Agus é a chur isteach ar spríd eile [And place it on another sprite].
John: S'ea.
Rose: Right click, deaschliceáil [Right click]. Agus an bhfeiceann tú Cóipeáil [And do you see 'copy']?
Fionn: Cóipeáil [Copy]?
Rose: S'ea. Cóipeáil agus cén spríd [Copy and what sprite]?
Fionn: No, we need it for the background.
Rose: Ok, só caithfidh sibh é a chur ar chúlra eile [Ok, you want to place it on another background].
John: Yeah.

9.4.2.3 STUDENT COLLABORATION

By the end of the year, more students preferred to work collaboratively (67%, n=18) compared to at the beginning of the year (59%, n=16) (Student Questionnaires 1 & 2). The class, in general, was very calm and relaxed during this iteration, even during our free play sessions. There was a hum of activity in the classroom and students rarely became distracted. Peer learning came to the fore as students coached and helped each other with spelling and grammatical issues, as well as technical ones. Furthermore, because students moved groups each week, they were always sharing what they had learnt. Sixty five percent (n=17) of students liked working in groups (Feedback Session 7). Three preferred working in pairs, however, and six preferred working alone (ibid). Interestingly, the classroom teacher preferred paired to group and individual activities. She found that students worked more productively, saying 'it's very easy to work together in pairs when you are only negotiating with one person' (Interview 3). Group dynamics proved troublesome at times, however, due to over-dominant members. In our final storyboard session, as my field notes reveal, a dominant group member took control of an entire activity:

John has turned it into his project and the other three boys more or less look on while he works. He has the storyboard and is working out the timing for the various backgrounds and wait blocks. He prefers wait blocks to broadcasting messages. Fionn and Séamus stand on the edge of the desk not taking part. At one stage they were playing chess, until the teacher returns them to the computer.

The following vignette describes this group's dynamic as they created their animated story:

Séamus: When is it anyone else's turn?
John: Yeah, just need to do the first scene.
Jack: We should put music in.
Séamus: Yeah, make them dance! We should put music in.
Fionn: Don't forget to put on music.
John: Ok, after this.
Jack: His idea, he's the director.
John: Seventeen seconds. Twenty seconds. Hide, Show, Hide, Show, Hide, Show for fifteen. Show for fifteen. Hide. Yeah.
Fionn: Have you got it? [*yawning/sighing*]
John: Hopefully.
John: Ok, who wants to go next? [after twenty five minutes working on their group project].
Jack, Fionn and Séamus: Me!
John: Copy my sprite.
Fionn: Dude, that's what I wanted to do. So, this is how you copy.
John: Yeah, he has the exact same script as mine. No, Fionn, Fionn, Fionn, not the...
Fionn: What did I do?
John: You used the stamper.
Fionn: Yeah, so?
John: We're copying.
John: Will I do this tomorrow?
Fionn: Yeah, sure.
John: I'll do most of it tonight.

9.4.2.4 PEER LEARNING

Students worked well together for the most part and coached and learned from each other as they created their stories. The following two vignettes show students helping each other with their spelling, grammar and voice recordings. In our first storyboard session, for example, one student helped another with her spelling:

Susan: Now, let's read it all.
Aileen: Dia is Muire dhuit [Hi].
Susan: Ok, next one.
Aileen: Neasa, conas atá tú [How are you]?
Aileen: It's spelled wrong. It's C O N A S. Conas atá tú.
Susan: Done.
Aileen: Tá mé go maith, go raibh maith agat [I am good, thank you].
Aileen: Cad is ainm duit? No it's not M N. It's N M, A I N M.
Susan: Ok.

In our final storyboard session, students discussed the correct preposition to use:

Fionn: Bhí Bouncer ag troid [Bouncer was fighting]. How do you say he fought with?

Jack: Leis [With].

John: Is it 'le'? L E?

Jack: Yeah, bhí Bouncer ag troid le Tree Rex [Bouncer was fighting with Tree Rex].

Fionn: Stop ag troid [Stop fighting].

Séamus: No, use messing, what's messing again? I know it, it's ag 'pleidhcíocht' [messing]!

During our second technology session, students practised their narration for their audio recording:

Aileen: Dia dhuit [Hi].

Susan: Dia is Muire dhuit [Hi].

Aileen: Conas atá tú [How are you]? No, I don't want this recording.

Susan: You know we can do this.

Aileen: You need to press that. Dia dhuit.

Susan: Dia is Muire dhuit.

Aileen: Conas atá tú [How are you]?

Susan: Tá mé go maith [I am good].

Aileen: Cad is ainm duit [What's your name]?

Susan: Siobhán is ainm dom [Siobhán is my name].

Aileen: Let's listen to it. One more time.

Susan: Ok.

[They record this segment three more times at Aileen's request]



Figure 9.8: Students Helping Each Other Record their Voices

The following two vignettes show students helping each other with their code. In our first technology session, students worked together to fix their timing issue by adding wait commands to the text commands. Timing in their programmes was their biggest issue but students became more aware of this as the iteration progressed:

Cian: Yeah, I need to change it by five seconds.
Seosamh: We did 'Ó, a Dhaidí' [Oh Daddy] too fast. It came up before it even said stuff.
Cian: Oh yeah. We just need to make this go on for a little bit more time. Fan soicind [Wait a second]. Ocht soicind [8 seconds].
Seosamh: Yeah.
Cian: That should be okay now.
Seosamh: Let's watch it one more time.
Cian: Déan deifir mar tá cartún ar siúl [Hurry up because the cartoon is on]. Ó a dhaidí.
Seosamh and Cian: Cuir slacht ar an seomra codlata [Tidy up your bedroom].
Cian: Yes! Ceart go leor [Ok]! Teacher! A mhúinteoir [teacher]! A mhúinteoir, tá sé críochnaithe [Teacher, we're finished]!
Teacher: An bhfuil sibh críochnaithe [Are you finished]?
Cian: Táimid críochnaithe [We're finished].
Teacher: Taispeán dom é [Show me].

In our third technology session, students progressed to the Show/Hide command when fixing their timing issues. In the following dialogue, we see how John learned from Cian, who explained most of his actions in Irish:

Cian: Go onto Cuma [Looks]. Then, am, Taispeán [Show].
John: Yeah.
Cian: Fan [Wait] [*adding a wait block*].
John: For how long?
Cian: Say five, fan cúig soicind [Wait five seconds].
John: Cur i bhfolach [Hide].
Cian: Buachail a ceathair, cur i bhfolach [Boy number four, hide]. Fan cúig soicind [Wait a couple of seconds]. Taispeán [Show].
John: Taispeán.
Cian: Now go on to Féach Isteach [Look Inside]. Go onto Stáitse [Stage], yeah, now make another one. I'm going to need a Rialú [Control],
John: How do you stop it?
Cian: Rialú [Control].

As per the previous iteration, students continued to leave comments for one another praising their peers for their work and offering technical advice. Many of their comments were in Irish.

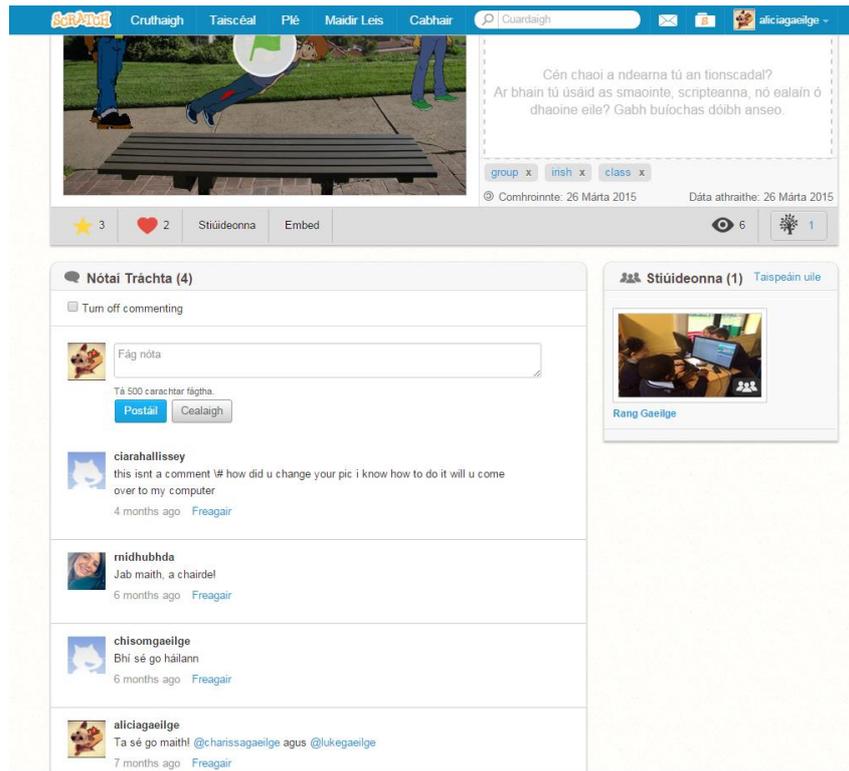


Figure 9.9: Students Commenting in Irish

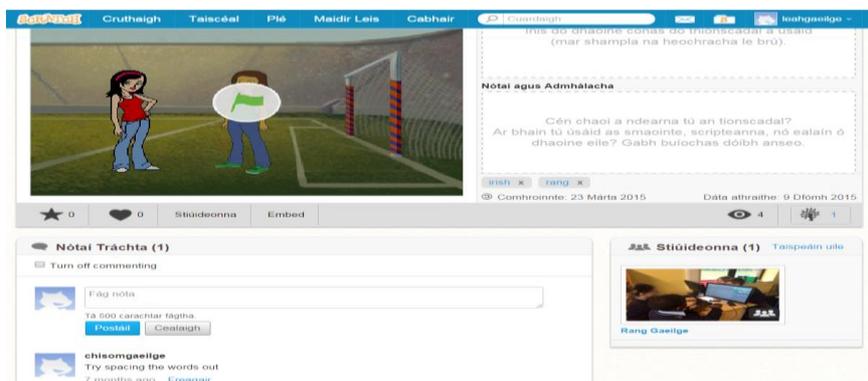


Figure 9.10: Students Offering Technical Advice

9.4.3 TECHNOLOGY

We had to adapt Scratch's learning environment to use it more effectively in the classroom. Initially, the girls showed less interest in our Scratch activities compared to the boys but as the iteration progressed their level of interest in Scratch increased to the point they were creating Scratch stories at home. This was a more technically challenging iteration but students rose to the task and made great progress.

9.4.3.1 SCRATCH LEARNING ENVIRONMENT

We initially downloaded an older version of Scratch (version 1.4) to all classroom computers as this was the version installed in the computer room. Having students work on a standalone application also reduced our dependency on Internet connectivity. As the iteration progressed, however, we realised that students were using the newer online version at home and decided to install the corresponding offline version (Scratch 2.0) on the computers at school. We also noticed that this version contained more Irish and more programming blocks compared to version 1.4.

Unlike GA and LBT, Scratch does not have a classroom management system and student accounts require email addresses. Even though Scratch is not compatible with my STORIES framework, we pursued it in this iteration as it was the programming language most popular with children and teachers, and it could be localised to Irish. I had to create individual student email accounts in order to open a Scratch account for each student. I also registered a class email account in order to create a shared online space, known as a studio in Scratch. We stored all of our Irish animations here. We did not include remixed projects⁵⁷ in our studio as we wanted to showcase original creations only. Each student had to be promoted to curator status so that they could share their Irish animations to this studio.

⁵⁷ Scratch material created by others, built upon by other community members and shared under a Creative Commons license.

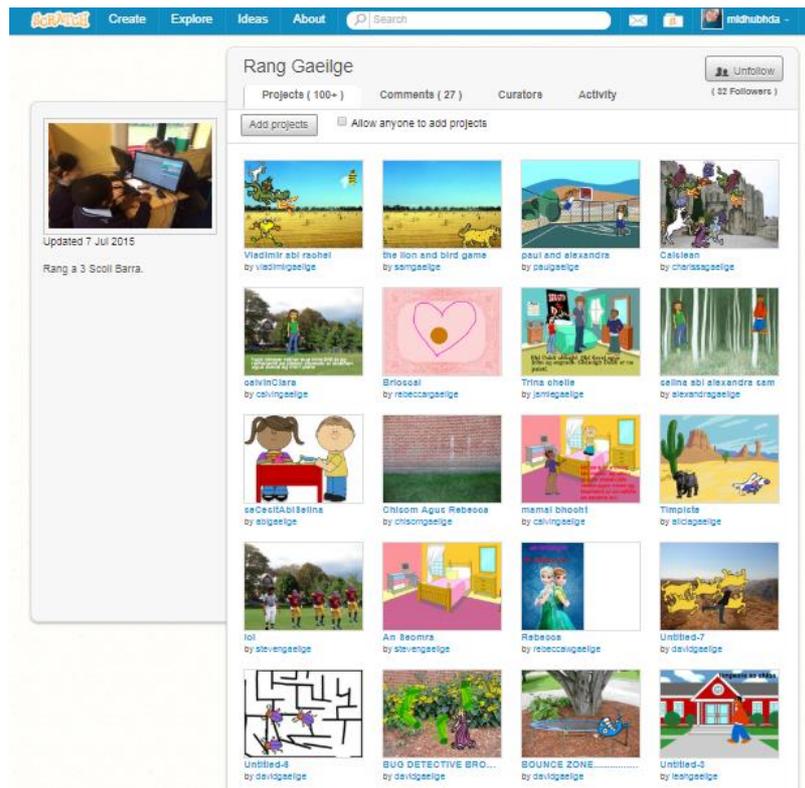


Figure 9.11: Class Scratch Studio

The following diagram illustrates one student's Scratch account where she created 14 Irish animations in total, 8 of which were created at home.

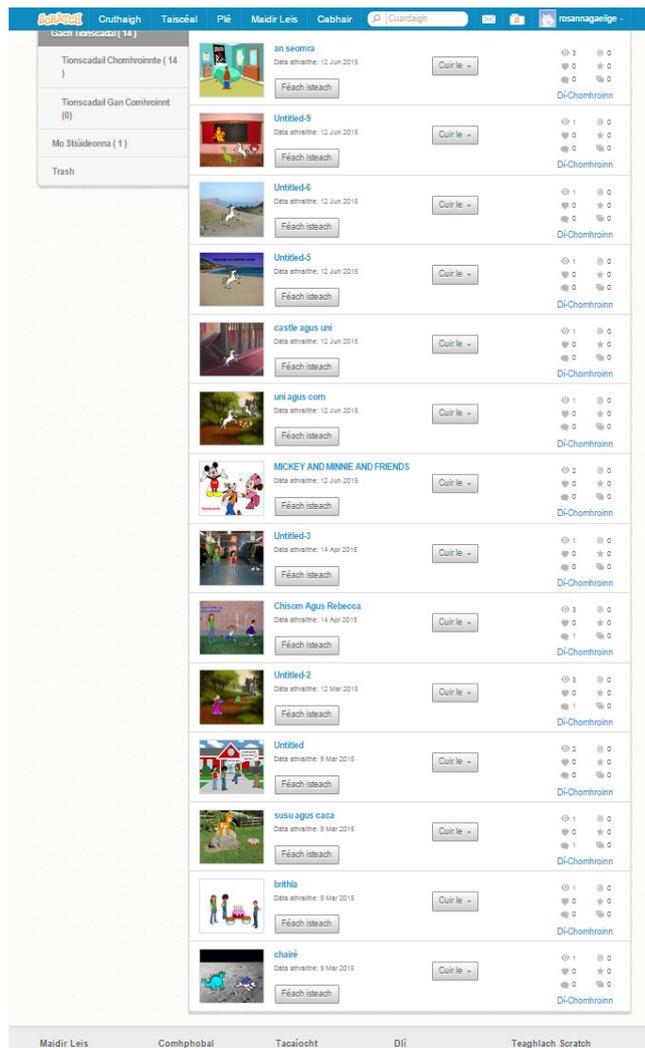


Figure 9.12: Student Scratch Account

To enable and encourage greater collaboration across groups, I also created a shared DropBox folder and installed it on all our computers in the classroom. Students saved their digital resources to this, as well as their Scratch projects.

9.4.3.2 LESS INTEREST FROM GIRLS

The majority of girls and two boys preferred GA to Scratch (George and Dáithí) (Feedback Session 6). Nonetheless, 92% (n=23) of students said that they liked Scratch and thought coding stories was a fun activity. Their comments were mostly positive: 'It is very hard to do but it is fun', 'I can't really get it yet but I bet it will be fun' and 'I bet I will get to like it soon'. Encouragingly, we asked this question in

Irish: 'Cad a cheapann tú faoi Scratch?' (What do you think of Scratch) and 36% (n=9) of students responded in Irish, leaving comments such as: 'Is breá liom Scratch' [I love Scratch], 'Is maith liom Scratch' [I like Scratch] and 'Ní maith liom Scratch' [I don't like Scratch].

Girls were not as keen as most of the boys in the beginning. In our first technology session in the computer room, my field notes reveal that some of the girls were not as engaged as they normally would have been:

Aileen and Rita were a little quiet and shy today. Not as confident as they normally are. They still tried it out though and Fionn was teaching them!

The teacher echoed my concern several days later in her email correspondence:

The girls aren't likely to feel brave about this, but they will end up being just as good as the boys in the end. It was the same with Go Animate, if you remember John, Fionn and them just took off with it, but the girls were well able in the end.

We decided to combine coding and design elements together the following week and focus on sprite costume and background changes in order to stimulate more interest. As the iteration progressed, this gender divide had disappeared as all students, boys and girls, were creating good Scratch stories.

9.4.3.3 TECHNICAL CHALLENGE

At the beginning of our intervention the teacher believed that only a small group of her students 'would be able for Scratch', boys more so and 'maybe a couple of girls' (Interview 1). She stated:

I would need to take that group and do a really scaffolded Scratch, really taking them through step-by-step, and then say: 'I've done one now, could you do one with different pictures, do the same coding, but just put in different pictures and just practise (Interview 1).

She also felt that it would work better at a higher class level: 'you could get a huge amount of engagement in fifth and sixth, but not in third, they're probably a tiny bit too young for that yet (Interview 1). While most students concentrated solely on design elements at the beginning of the iteration and avoided using programming blocks, they were all incorporating programming blocks into their stories by the end. In our first free play session in the computer room, for example, I noticed that Aileen was reluctant to engage with Scratch. In comparison to Jack, who had figured out how to move sprites around the stage using the arrow keys, an advanced command. Together, Aileen and I created a simple animation as my field notes reveal:

Aileen was very slow to try anything. She called me down and said she didn't know what to do. She seemed worried. Together we found a background and a character, and we created a speech bubble for her character. She settled after that.

By the time we reached our final technology session, Aileen was constructing great Scratch stories. At one stage she showed me a work around for a common problem involving text blocks. In Scratch, if you make a mistake in your text block, you need to delete both the text and the background and start again. The text and background become one layer, unlike GA where elements are placed on individual layers and can therefore be easily removed. My field notes describe her actions below:

I was very impressed with Aileen today when I saw her writing her text on a white background, it made a lot more sense. If she made a mistake, she didn't have to delete the text and the background, just the text. So she has in fact eliminated a step in this process. Very clever. She added her text to the stage and then added her background.

This cycle proved more challenging in terms of technical skills. As the teacher observed at the beginning of this iteration:

It's probably the most technically difficult thing we've done so far, it's harder to get to the finished product. In terms of troubleshooting, they probably need a bit more support, if something goes wrong, they find it hard to find it (Interview 3).

Blumenfeld et al. (2006) note that when learning tasks are too difficult or time consuming, students may not put in the effort to accomplish their learning goals. We expected this at the beginning of the iteration, but students persevered in terms of Scratch. I was particularly impressed with Ruth, one of our weaker students, and her attempt to move her dog from one side of the stage to the other during our first free play session. She placed two dogs on her screen; one at her start point and another at her end point. In showing her how to animate her dog, I spoke only in Irish to her and she understood and implemented my instructions:

Ó, ana chliste, Ruth! Tóg madra amháin amach as. Níl ach madra amháin ag teastáil uait. Só teastaíonn uait é seo a bhogadh. Bog [command] means 'move'. 10 gcoiscéim. 10 steps. Cuir isteach an brat glas chun é a chur ag obair. Brúigh ar an mbrat glas thuas anseo chun é a chur ag gluaiseacht. Tá sé ag obair! Anois, tá 10 gcoiscéim ana bheag. Má theastaíonn uait bogadh sall go dtí an gcuid seo den stáitse, caithfidh tú an uimhir seo a mhéadú. Cuir isteach caoga anseo [Very clever, Ruth! Take one dog away. We only need one dog. So you want to move him. Move him 10 steps. Add the green flag to get it working. Click on the green flag up here to move your dog. It's working! We need to increase our number of steps if you want your dog to move all the way over here. Put in 50].

In our second free play session, some students figured out how to change backgrounds attracting interest from other students:

Teacher: Só, d'athraigh siad an stáitse [They changed the stage].

Dáithí: Every five seconds.

Rose: Só, athraíonn an stáitse, a haon, dó, trí, ceathair, cúig bhabhta [So the stage changes, 1, 2, 3, 4, 5 times]!

Teacher: Só [turns to the class], d'athraigh siad an stáitse. Só tá cúig chúlra acu [They have five backgrounds]. [*Round of applause from the class and students come over to look at their code*]

The following two diagrams illustrate how students advanced from basic wait blocks to broadcast blocks in order to animate their stories.

For example in our third technology session, students figured out the appropriate font to use with Irish text in order to incorporate the síneadh fada (language accent). Neither the teacher nor I knew this:

Cian: Will you do the typing?

John: Type in what?

Cian: Ah, Bhí Niall agus Dónal sa chistin. Bhí an gloine ar an mbord.

Cian: The title's already there. Oh, put it in Donegal [font].

They enjoyed teaching us and were comfortable troubleshooting with us, upholding Papert's (1993b) sentiments that the 'teacher too is a learner, and that everyone learns from mistakes' (Papert, 1993b, p. 114). The ensuing exchange reveals this interaction where the teacher and students troubleshoot an audio problem together during our third technology session:

Seosamh: John, all you have to do now is just talk into it, press the circle.

John: No, there has to be a thing there.

Teacher: Ó, níl sé casta ar siúl [It wasn't turned on]. Déan aríst é [Do it again]! An bhfuil sibh réidh [Are you ready]?

Cian: Timpiste sa Chistin [Accident in the Kitchen].

Teacher: No, níl sé ag obair [it's not working]. Tá sé ag obair ar Vocaroo, ach níl sé ag obair ar Scratch. [It's working on Vocaroo but not on Scratch]. A hAon, dó, trí [1, 2, 3]. Fadhb leis an bhfuaim anseo, Rose [Audio problem here, Rose].

John: Could you save it on Vocaroo and upload it to Scratch?

Teacher: Is féidir [Yes].

Seosamh: Cian pressed 'Deny' a while ago.

Teacher: Deny?

John: And then it wouldn't come up again.

Seosamh: You should've pressed 'Allow' and it would've worked.

Teacher: A hAon, dó, trí. hAon, dó, trí [1,2,3,1,2,3]. Tá sé ag obair [It's working]!

Students also experienced learning transfer as they assimilated tools they learned in previous iterations into this one:

I noticed them all online looking for images, saving them to the desktop and then importing them into Scratch. With such ease (Rose, Interview 3).

9.4.4 ENGAGEMENT

Students were genuinely interested in learning Irish so that they could use it in their stories. The teacher described our innovative activities as the:

...carrot at the end of the class for students, that if you learn enough we are going to go on, we are going to write a story, you better learn the vocab, it's like a motivator' (Interview 3).

Digital badges and publishing their stories on the school blog also served as an added incentive to motivate students in their story writing and digital creations. They were extremely focused and engaged from the outset as my field notes indicate from our first technology session:

Their level of concentration was incredible. Complete calmness in the classroom. Fionn, Aileen and Rita created a fantastic animation with several backgrounds and characters. They included a voiceover and Fionn even used the pen tool to draw shapes! He called me down several times to show me, his excitement was palpable!! He kept telling me how much he loved it.

The teacher also mentioned how students were very familiar with the materials in their textbooks and that this was not the norm:

They're using it more for spelling...even the other day we were learning 'is maith liom a bheith...' and we came across 'ag canadh' and someone said, oh 'canadh' is at the back of the book, so they were all able to go to the back, they knew that themselves...kids generally don't do that (Interview 3).

We asked students for their thoughts on using Scratch in their Irish lessons and 85% (n=22) of students said they enjoyed it (Feedback Session 7). In fact, during our second storyboard session, George asked the classroom teacher:

George: Do we have to go back to boring Irish?

Rose: Boring!

Teacher: I'd like to say thank you for that, George! Ha!

Students showed initiative in their learning. For our final lesson, the students created a story of their own choosing. They selected their own groups and discussed their stories in the days leading up to our Irish lesson. John downloaded a multitude of images to his Scratch account and prepared the story and code in preparation for our two final sessions.

John: I downloaded stuff on my Scratch account.

Rose: Wow, maith thú [well done]! An bhfuair tú na pictiúirí inné, John [Did you get your pictures yesterday]?

John: S'ea [Yes].

Fionn: Yeah.

Rose: Maith sibh [Well done]!

Despite his initiative, his over dominant behaviour during these lessons resulted in other members disengaging, as my field notes reveal:

Fionn and John record the next scene and write the code. Jack and John move over to the speaker to hear the recording. Séamus sits down and tries to get involved, but sits back after several seconds. He spins around on the teacher's chair and looks out the window. John is extremely focused. Jack too. Fionn is in and out. But Séamus has totally opted out. John has certainly controlled the last two sessions and hasn't given many opportunities to Séamus, Fionn or Jack to work on their animation.

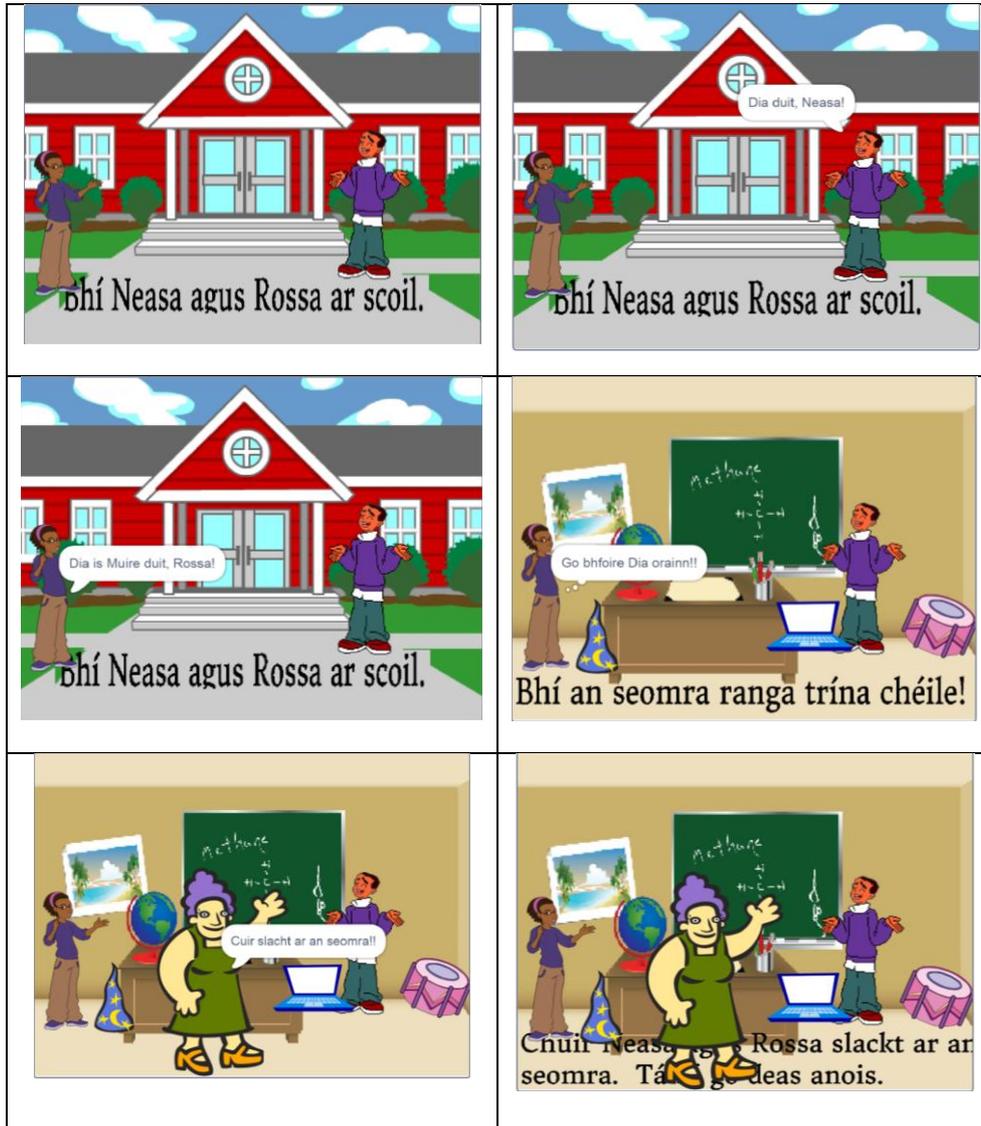
Students explicitly asked us how they could access Scratch from home. They never asked us about this during our time working on LBT or GA. Half the class spent one hour a week on Scratch at home, with eight students spending three hours on average (Feedback Session 8). Even though they created fewer Scratch animations at home compared to Go Animate, the number of Irish animations equalled the number of English animations. They created 104 Scratch stories at home, of which 40% (n=42) were in Irish and 40% (n=42) in English. Prior to this, English was the predominant language used in their stories outside of the classroom. One student created the following Irish Scratch story at home about his favourite things. It is composed of several scripts and sprites, a hand-drawn background, nine text bubbles and timing sequences.

Table 9.2: Scratch Story Created Outside of Class



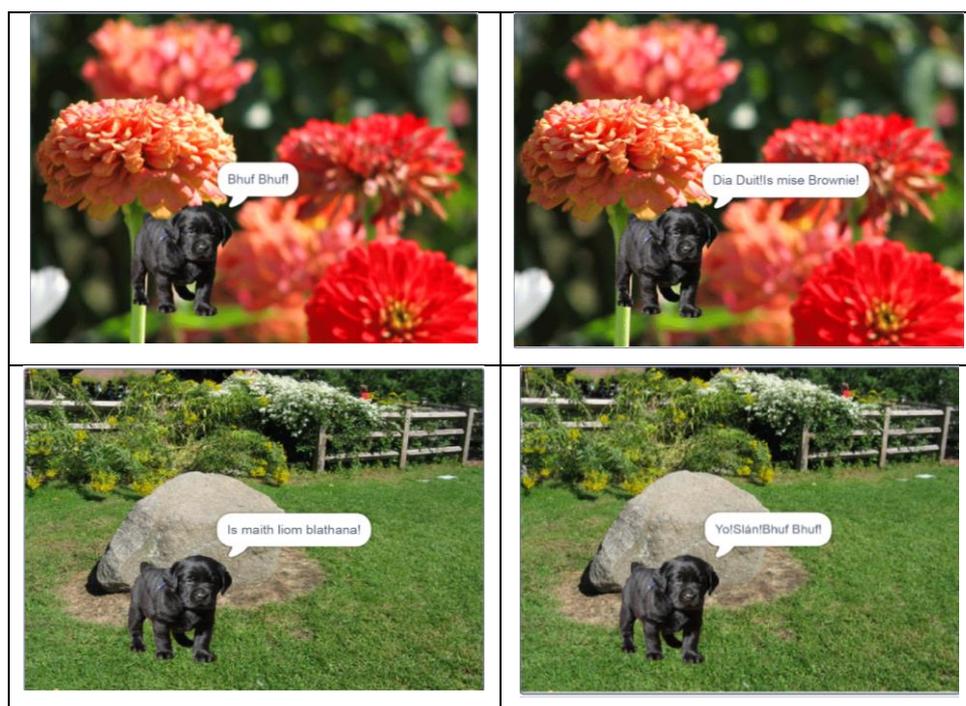
John created fourteen Scratch stories outside of class. Three of which were in Irish and one of his Irish animations, depicted below, included a voiceover.

Table 9.3: Scratch Story Created Outside of Class



Rita created four Irish Scratch stories about her dog. They all included a voiceover. One is illustrated below in tabular format.

Table 9.4: Scratch Story Created Outside of Class



9.5 CONCLUSION

The typical end-result of a DBR process is the embodiment of practice and theory (Hall et al., 2016). I believe that this instructional intervention has reached a point of stability, where the desired learning outcomes are close to being achieved (Bielaczyc, 2013; van den Akker, 2007). This instructional intervention was systematically tweaked through each iterative cycle of the design-based research study from 'pilot, through mainstream, to capstone' (Hall et al., 2016, p. 9), culminating in my adoptable and adaptable TALES model. TALES can be employed and repurposed by other Irish-language teachers to support a more active, communicative and creative approach in their classrooms. This model promotes a learning environment in which students are encouraged to explore and tinker with both language and technology as they engage in digital and animated storytelling activities. Findings from my other data collection instruments are discussed and triangulated in the next chapter.

10 CHAPTER TEN: FINDINGS AND DISCUSSION

10.1 INTRODUCTION

This chapter reviews findings in relation to students' abilities in and attitudes towards the Irish language. I explore parental input and remarks made by our students several months later when in fourth class. I also incorporate opinions from their current teacher as to how this fourth-class cohort compares with previous cohorts as this was her fifth time teaching fourth-class students. Furthermore, I reveal how our classroom teacher employed TALES in her own teaching the following year. In addition, I explore data from my national teacher questionnaire in light of the teacher's main concerns with using technology in the classroom and the barriers to doing so effectively. I also look at the curriculum and the pressure concerning curriculum coverage.

10.2 SUMMARY OF INSTRUCTIONAL INTERVENTION

Digital and animated storytelling activities in the classroom combine four student-centred learning strategies including engagement with learning; pedagogical integration of technology into learning; collaborative learning; and reflection for deep learning (Barrett, 2006). Students were deeply immersed in the Irish language as they engaged in digital and animated storytelling. They first constructed their stories on paper and reconstructed their stories digitally, drawing on all four language skills in an integrated holistic way. In this way, they produced multiple representations of their learning, thus embedding language at a deeper level and enhancing their digital skills in the process. They worked collaboratively together on meaningful authentic activities, undertaking a more active role in their learning (McCombs, 2000). As they articulated their learning, they negotiated meaning and resolved misunderstandings, thereby deepening learning and developing communication and interpersonal skills in the process (Dede, 2000; McCombs, 2000). The teacher facilitated their learning by extending each student's ZPD through short instruction bursts and scaffolded instruction. They created shareable learning artefacts, with the potential of contributing to a limited pool of resources

for the Irish language. Fostering positive Irish-language learning experiences was our main objective, however. Furthermore, whilst students made learning gains in technology, developing their 21st century learning skills, this was subsidiary to the main goal of enhancing their ability in and attitude towards the Irish language.

10.3 EVALUATION OF INSTRUCTIONAL INTERVENTION

In the previous three chapters I showed how students' ability in the Irish language improved as the intervention progressed. The following section highlights this improvement paying particular attention to their expressive capabilities involving written and oral activities. I also triangulate these findings with their results from two standardised tests. I note how students' parents were concerned with their children's progress in Irish, conflicting with findings from the literature and my questionnaire findings. I follow-up with students and their current teacher when they are in fourth class and convey how one of the sixth-class teachers adopted TALES in his Irish lessons.

10.3.1 LANGUAGE GAINS

We encouraged communicative language learning in our classroom, emphasising language-in-use (Bloome & Green, 2015; Bruner, 1981; INTO, 2004; Savignon, 1987; Shiel et al., 2012), reflecting Papert's (1993a) notion of 'knowledge-in-use' (p. 63). In this way, language skills work together and not in isolation (Gee, 2015; Kennedy, 1991; Richards, 2005). Before undertaking this instructional intervention, I asked the teacher what she hoped to achieve and she replied:

That the kids would enjoy Irish more. I want my students to want to speak it more. To be able to use it more and use it spontaneously. And that's what we don't have at the moment because you're drawing blood from a stone trying to get them to speak Irish (Interview 1).

Early in the year, we learned that only 19% (n=5) of students looked forward to their Irish classes (Student Questionnaire 1). By the end of the year, however, this had increased to 88% (n=23) (Student Questionnaire 2). This reflects a substantial positive change in their attitude towards and interest in Irish. Eighty five percent (n=22) of students believed that our innovative Irish-language learning activities

helped improve their Irish (Questionnaire 2). Eighty five percent (n=22) saw an improvement in their vocabulary and 81% (n=21) felt their spelling had improved. Eighty five percent (n=22) of students felt their knowledge of grammar and their pronunciation had improved (ibid).

As conveyed in previous chapters, we witnessed a marked improvement in their comprehension and in their written skills. Their oral skills improved too, but at a slower rate. We found that their oral and written language skills developed as they 'engaged in meaningful experiences' in which they saw the 'need to communicate' (Palincsar, 1998, p. 371). Students wanted to learn Irish so they could write their stories: 'they want the Irish so they can use it for their stuff' (Teacher, Interview 3). The teacher noticed an overall improvement in their Irish, especially in their writing:

I think overall their Irish has improved hugely. Their interest in Irish has improved hugely. And like earlier in the year, I was saying it was hard to see it, besides any anecdotal evidence in the classroom, whereas now you can see it in their writing, they are not making mistakes, they are using proper verbs and 'sa' plus a 'h', and correcting themselves, and their spelling is better as well (Interview 3).

When I inquired if this improvement was simply due to a natural progression in learning, she replied 'there would be some, but not anything remarkable like we have seen this year' (ibid). She attributed this improvement to our innovative activities stating:

Sure nothing really changed with their normal Irish classes, with Bun go Barr [textbook] and the grammar and the poetry. I think it's due to our intervention. The main reason is motivation...they want to learn it so they can use it...they're more interested in even the book now because they know they might use something they learn later on (Interview 3).

The teacher emphasised the role of storyboarding in our overall activity stating:

It's good to go from paper to something that's on screen, you know, to be able to visualise it. It's a great 'scribhneoireacht' [writing] activity, it's very realistic and there is a huge purpose for it. They were very driven to get it done and get it right (Interview 3).

She set a significant writing task for her students at the end of the year, an essay activity she had never contemplated doing with a third-class cohort before:

I have never at the end of the year asked third class to do essays. They're only introduced to writing in Irish this year. It's always been really simple, like giving them a framework of sentences and sometimes it's only fill in the blanks, that's their writing. But this year now I felt really confident in asking them to write an essay (Interview 4).

This is especially noteworthy considering one of the questionnaire respondents stated that third class students 'needed a lot of support in Irish' and that they 'were not capable of much independent writing work (NTQ, 2015). She was impressed by the standard of Irish in their essays. She remarked on how they remembered the content they learned during the year saying 'things really stuck in their heads, which they wouldn't usually, it's like in one ear and out the other'. She mentioned the improvement she saw in two of her students' written skills, in particular:

Róise's was really good...the story was brilliant. She actually wrote two and a half pages of good Irish. Cian's were shorter, but the Irish in them was exceptional. I was showing the principal and he couldn't believe what they could do. Things like 'séimhiús' and 'sa' plus 'h'. In other years, I'd be drilling and drilling and the top third might get it. I would say nearly every child had that by the end of the year. I also showed the sixth class teachers, they genuinely couldn't believe what the kids were writing. One of them said he would be so happy if he got handed up an essay like Cian's. Literally, he said the content, the grammar, even the handwriting were exceptional (Interview 4).

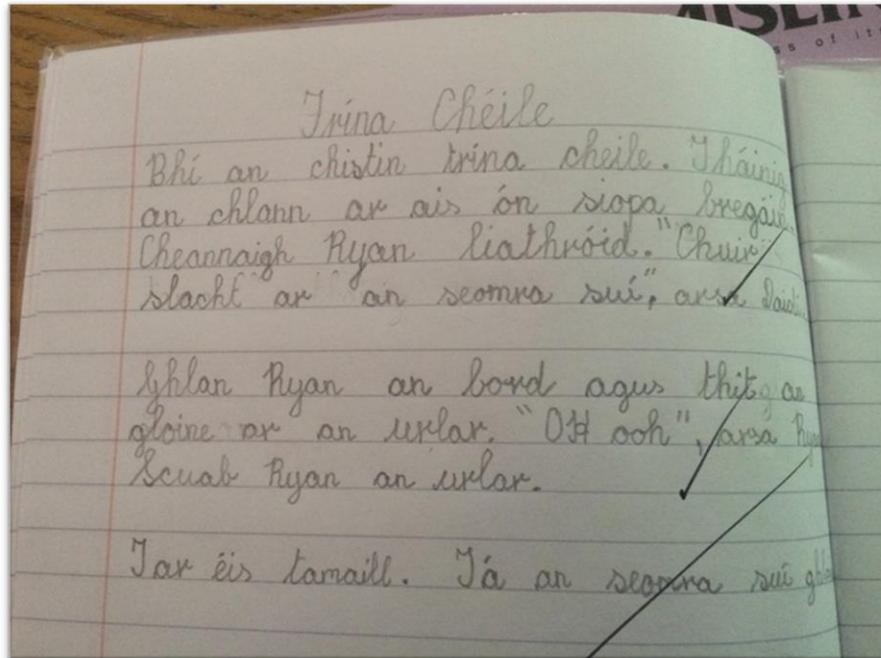
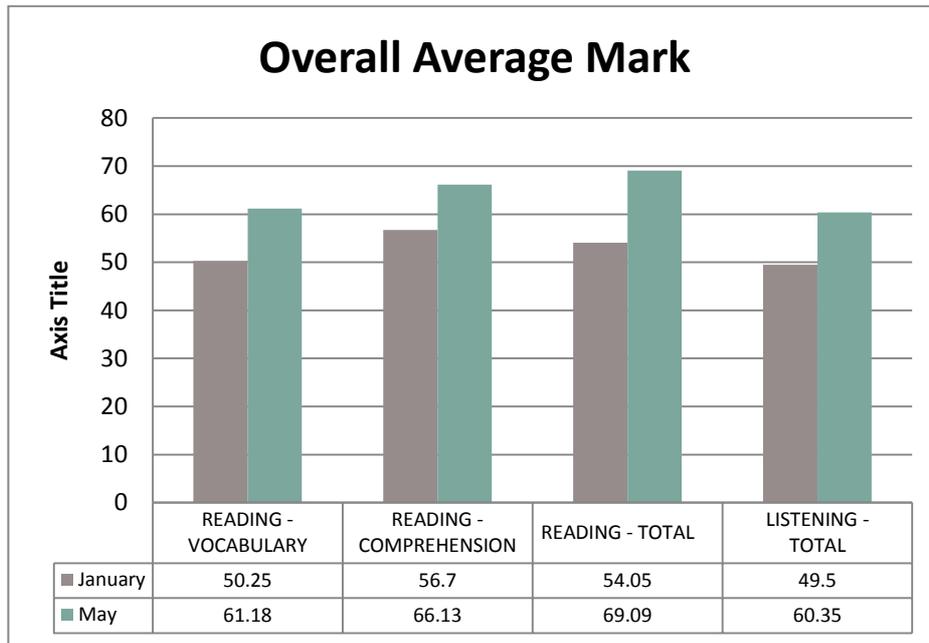


Figure 10.1: Short Essay Written by Third-Class Student

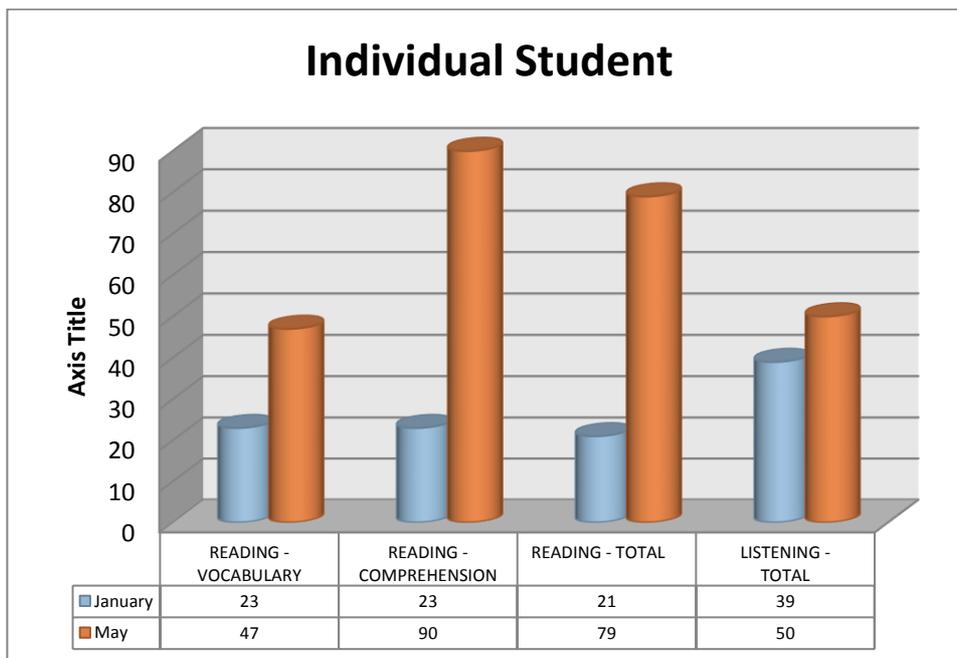
We also administered two standardised Irish-language tests during iterations two and three, 16 weeks apart. The results emanating from these tests have a dilute effect on research, however, as this study is not an experimental one. In addition, these tests only assessed superficial knowledge of the Irish language, evaluating 'decontextualised and compartmentalised knowledge' (Sawyer, 2008, p. 9). The positive results attained from these tests should be interpreted guardedly, therefore, as they cannot be specifically linked to TALES. Nonetheless, they do offer a plausible indication of language learning gains, especially when such tests contain objectively scored items. The diagram below conveys the overall average mark students received in January and in May in both reading and listening categories, revealing an improvement overtime. Reading was further subdivided into Vocabulary and Reading Comprehension. The diagram below depicts an increase in class average percentiles across both reading and listening skills.

Table 10.1: Overall Class Average Mark between January and May



The following diagram illustrates the improvement for one individual student (John) between January and May.

Table 10.2: Individual Student Marks between January and May



Students were deeply engaged in their learning during our instructional intervention. They enjoyed and showed interest in their learning activities (O'Brien & Toms, 2008). They were intrinsically motivated to learn Irish as they needed it for their stories. They showed initiative in their learning, especially when they went 'beyond the requirements of their assignments' as some of the students did in our final two classes. They also tinkered with technologies and reengaged with their stories outside of the classroom (Sandholtz et al., 1994). They became so immersed in their learning activities that they would lose track of time (Csikszentmihalyi's, 1991) and were slow to wrap up their work at the end. For the most part, students felt challenged but not overwhelmed by our activities (ibid). They coached and learned from one another (Sandholtz et al., 1994). Errors were noticed during peer corrections and playback, and learning was deepened during times of articulation and reflection. When students previewed their stories or listened back to their narrations, they would often notice misspellings, mispronunciations and misuse of capital letters, and would return to correct them. They genuinely cared about resolving such issues, demonstrating a 'commitment of attention and resources to reasoning about an aspect of a problem' (Reiser, 2004, p. 287).

10.3.2 PARENTAL SUPPORT

As the intervention drew to a close, parents provided some feedback through a short questionnaire. Eighty nine percent (n=24) of parents noted a positive change in their children's attitude towards Irish and 78% (n=21) of parents noticed their children showed more interest than usual in Irish. One parent left a note regarding her son's progress, which is depicted below. Interestingly, the same parent returned her signed consent form at the beginning of the year with a note conveying her concern in relation to her son's confidence and ability to converse in Irish. Both notes are presented below.

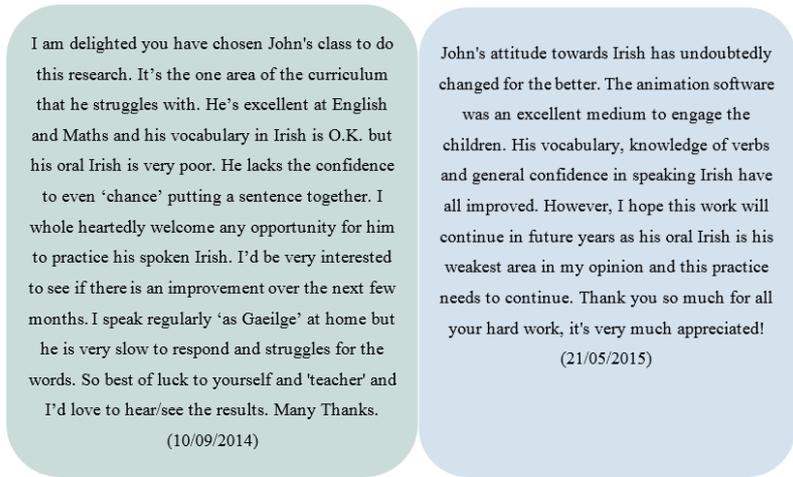


Figure 10.2: Parental Feedback Before and After Intervention

Other parents left notes regarding their children's progress and the enjoyment they experienced while learning Irish that year. These are portrayed below.



Figure 10.3: Parental Feedback

I also received the following message, written in Irish, from one of my students on our last day.



Figure 10.4: Student Message after Intervention

The teacher also noted how she received messages of appreciation from parents: 'I got lovely letters at the end of the year and cards from parents, thanking me for all the work we did with Irish and with the computers' (Interview 4). These parental comments conflict with findings from my National Teacher Questionnaire, however, and with other researchers who found parents to be negative in terms of their children's Irish-language learning in school (DES, 2007; Harris et al., 2006; Harris, 2007; Harris, 2009; NCCA, 2008). Teacher respondents seemed disheartened by the lack of parental support and interest in their children's Irish-language learning, stating: 'At the moment with little parental interest the pupils see the language as a school only thing' and 'Anything that will engage the children as they have little interest as parents are not interested and all feel it's a waste of time so it's a constant battle in Irish lessons'. One particular respondent shared:

There is an ever-increasing negative sentiment towards Irish and the learning/teaching of Irish among the parent populace. It would be very difficult to create enthusiasm for an initiative that would promote Irish. Increasingly, pupils are picking up on their parents lack of interest in Irish and therefore lessons are becoming more difficult and homework is completed rarely.

10.3.3 THE FOLLOWING YEAR

I returned to the school the following year to meet with our students, then in fourth class. They completed a short questionnaire in terms of teaching and learning Irish. Their current teacher also completed a questionnaire sharing her opinions about their language ability. I interviewed the sixth-class teacher who adopted TALES successfully in his Irish lessons.

10.3.3.1 FOURTH-CLASS

I asked students for their opinions in relation to traditional and innovative approaches to learning Irish. Eighty eight percent (n=23) of students thought learning Irish through digital and animated storytelling was a better way to learn Irish. They included comments such as: 'it will motivate them to do Irish', 'it makes Gaeilge more fun and creative. Irish is kind of boring when you have to write, but the animations make it way more fun!' and 'you learn more grammar and it is fun'. Their current teacher also completed a questionnaire regarding their language ability. She found that her students this year were more confident than usual in speaking and writing in Irish. She also felt that they were more competent in Irish compared to previous cohorts, particularly in terms of their reading, writing and listening skills; in their pronunciation; and in their knowledge of grammar.

In addition, I asked students if they had any tips for teachers and they offered suggestions such as spending more time on Irish; doing more oral work; incorporating group work; using more technology, animations and games; and giving students more opportunities to write stories and create animations. Students left comments such as: 'the exact same way you do it because it was very fun', 'don't make it complicated' and 'I would like it to be more technical because it's learning it in a fun way'. One particular student stated: 'Well no offence to my teacher but I really want Irish to be like more exciting, not just reading and writing.' They also offered advice to other students learning Irish such as listening to your teacher and asking for help; to use a dictionary; and to practise more at home. One student shared: 'it's not tricky if you put your mind to it' and another advised: 'try your best and just do it I mean I know it's boring but it's a great skill to be able to learn new languages'.

10.3.3.2 SIXTH-CLASS

I also interviewed the classroom teacher from our instructional intervention. Her role had changed within the school and she was now acting as a support teacher for the entire sixth-class cohort, charged with a special focus on English literacy, mathematics and computer skills. She shared that she had incorporated TALES into her English and computer lessons, and that one of her sixth-class teachers incorporated TALES into his Irish-language lessons. Guided by the teacher, they spent ten weeks of second term creating animated stories using both GA and Scratch. He organised the students into groups of three based on mixed ability. The classroom teacher stated: 'I showed them GA and our storyboard template the first week. I did it all through Irish...and then the following week we storyboarded it and we did the groups correcting other groups' work....then we spent the following two weeks doing Go Animate' (Interview 5). Students quickly learned Go Animate: 'they took to Go Animate so fast, we thought third were good last year, they were doing things I didn't know how to do...it's their age'. She also found that they liked peer correcting more than third-class students: 'they were kind of complimenting the Irish and the stories'. They tended to write too much, however, as they were 'used to writing'. She also noticed that they were more open to speaking in Irish compared to third-class students: 'third found it hard to even start a sentence out loud, whereas sixth were a bit more like "I'll try it"'. Students also created animations at home, mostly in English but one student created one in Irish. They also used Scratch to create their animated stories and 'figured it out quickly'. I did not have access to these stories, however, as their Scratch accounts were private.

In an interview with the sixth-class teacher, he shared that his students became more interested in learning Irish during this time saying: 'When you ask them to take out their textbooks for Irish, you're sometimes greeted with the moan or the sigh, but once you are saying that you are working on computers they are happy enough' (Vincent, 2016). He mentioned one student in particular 'who had absolutely no interest in Irish' and while creating their animated stories he became 'so interested in getting the characters on, speaking at the right time, in sync with what was being said and written, and he was happy to use Irish as part of it...I never thought I'd be able to get him to speak Irish'. He particularly liked the idea of creating a short animated lesson for junior infants as a starting-off point '...so that they would get used to it, there would be a purpose for it. And it would really give them a good

focus'. He noticed that students who created more complex stories, struggled more with the technology 'because the kids who had the simple ones, they got it very quickly and they were able to push on onto harder stuff after'. He also mentioned how students 'were very proud of what they achieved'. He planned to incorporate TALES into his Irish lessons on a more regular basis where students 'would pick a theme...and create a story based on that. I think it could be a nice combination of your classroom work, heading towards that point after a month's work on the textbook'. He also commented on our third-class students' essays and the quality of their Irish '...because if that was coming in from mine, yeah well done here!'.

His sixth-class students created 13 Irish animations in total. They were much longer than third class animations and each one included audio, text and motion. Two of their animated stories are depicted in tabular format below. The first takes the format of a lesson for junior infants. The sixth-class teacher was taken with this as an introduction to animated storytelling as it gave his students a purpose. The second animation is about bullying.

Table 10.3: Animated Story 1 created by Sixth-class Students



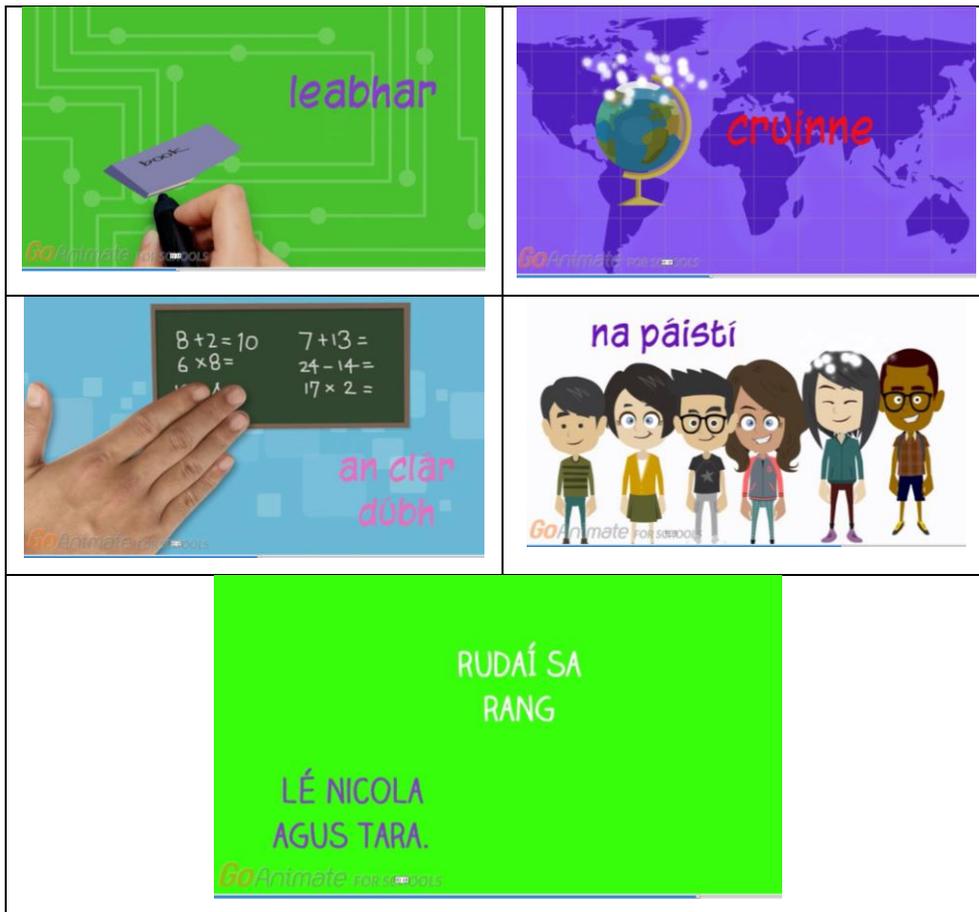
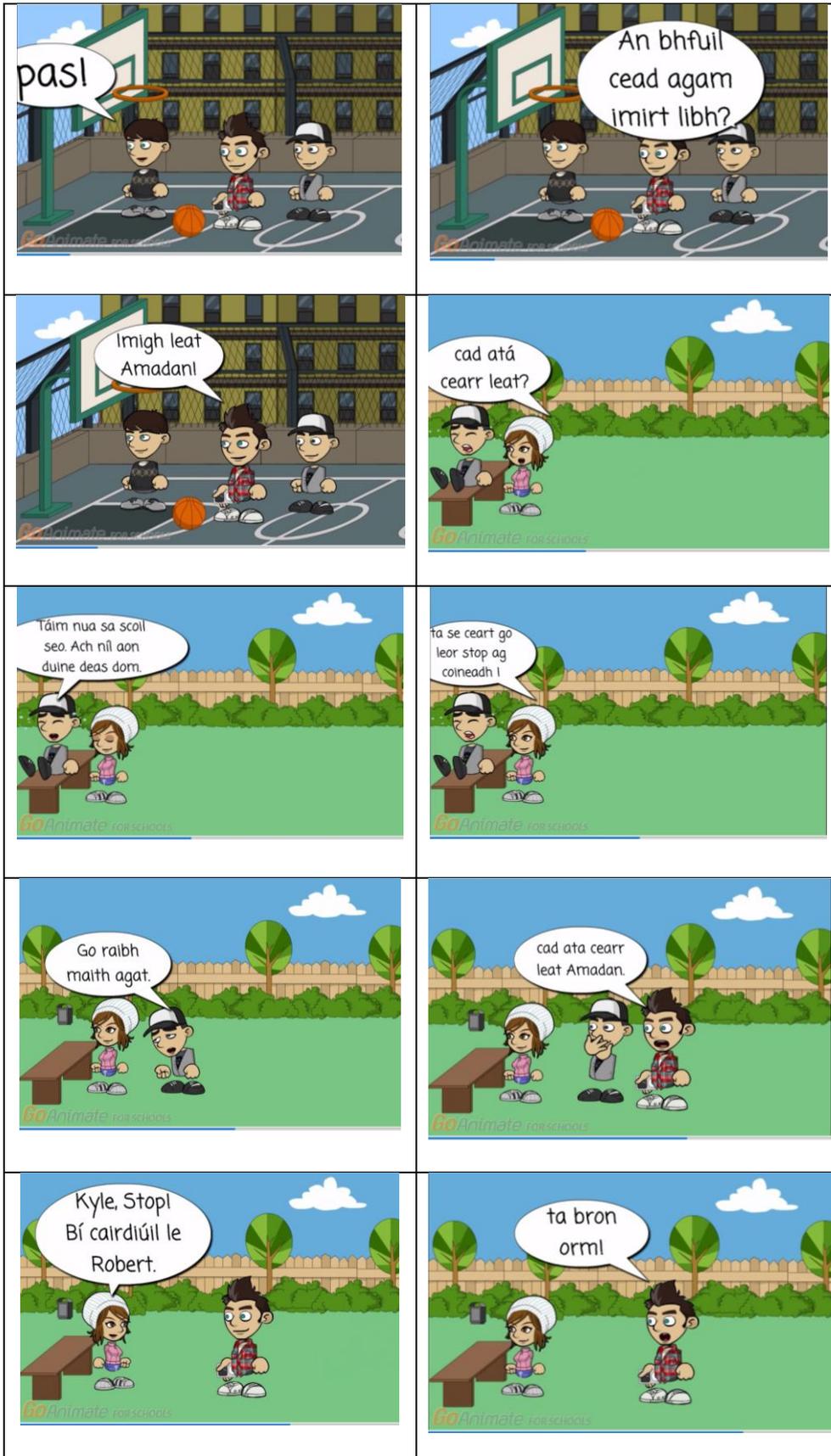


Table 10.4: Animated Story 2 created by Sixth-class Students







10.4 OTHER FINDINGS

As aforementioned, I implemented a national teacher questionnaire (NTQ) to investigate Irish-language teaching approaches and technology use in Irish-language lessons at primary school level. Of the 668 responses received, 450 of these had been completed in full and 218 had been partially completed. Cheema (2014) notes how the incidence of missing data in survey studies has become a common occurrence and claims respondents either simply forget to answer questions or intentionally ignore them due to irrelevance or difficulty in answering them. I suspect that many of my partially completed questionnaires were due to non-teaching principals responding as I received a multitude of comments stating this, despite my explicit request that only primary school teachers teaching Irish should complete my questionnaire. I analysed questionnaire items quantitatively and analysed all discretionary comments qualitatively. I felt that dismissing teachers' input was inconsiderate of their time and that these data were too valuable to discard.

10.4.1 HOW TEACHERS VIEW AND USE TECHNOLOGY IN THEIR CLASSROOMS

I found that 95% (n=632) of respondents had access to at least one computer or tablet in their classroom, with two devices being the average. Encouragingly, 77% (n=516) of respondents rated their computer skills as being 'good' or 'very good', with only 2% (n=14) rating them as being 'poor'. This was in sharp contrast with findings from a survey carried out by the DES in 2008 where only 30% of primary school teachers rated their computer skills as being intermediate or advanced. In terms of technology training, 65% (n=432) of teachers were self-taught. Many respondents mentioned the ECDL⁵⁸ qualification and CPD courses. In fact, only 28% (n=184) received formal education in computers such as a certificate (13%, n=85), diploma (2%, n=14), degree (5%, n=32), postgraduate diploma (3%, n=20) and master's degree (5%, n=33). In their 2008 study, the DES found that 4% of primary school teachers held a postgraduate qualification in ICT, which has doubled in the last ten years.

98% (n=569) of respondents believed that technology was a useful pedagogical tool. One respondent emphasised the importance of technology in enhancing student learning stating: 'Technology when used effectively without doubt enhances the learning experience for pupils and will lead to better learning outcomes in a fun manner'. The word cloud below lists the respondents' thoughts in terms of the positive aspect of using technology in the classroom.

⁵⁸ <https://www.ecdl.ie/>

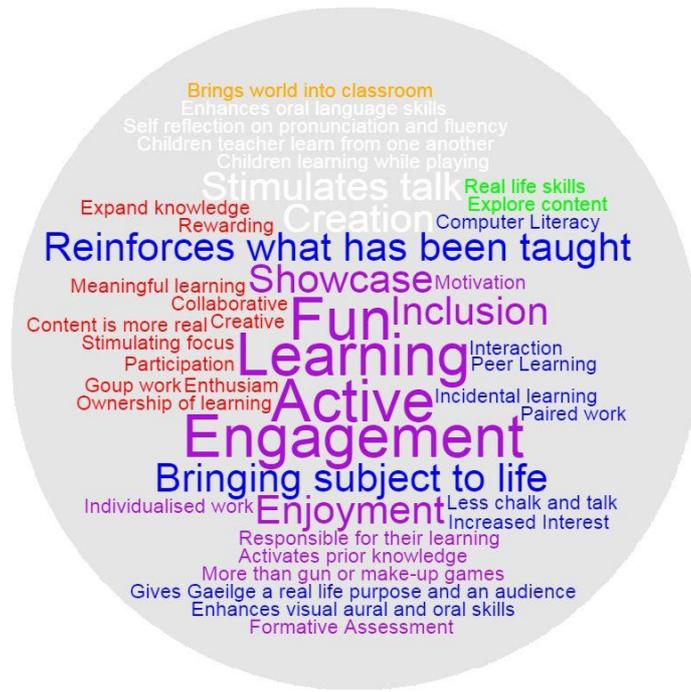


Figure 10.5: Positive Aspects of Technology-Integrated Learning

Worryingly, some respondents viewed the following as positive aspects of technology use in the classroom.

Table 10.5: Questionable Positive Aspects of Technology-Integrated Learning

<p>Presentation is always excellent (poor handwriting becomes irrelevant).</p>	<p>A different way of showing the same information!</p>	<p>Allows teacher to sit back a little more!</p>
<p>They are digital natives so they have grown up using technology at home.</p>	<p>Children who have poor handwriting skills can produce documents that are comparable to other children's work.</p>	

10.4.2 VIEWS AND USE OF TECHNOLOGY IN THE IRISH-LANGUAGE CLASSROOM

In terms of integrating technology into Irish-language lessons, respondents criticised the shortage of digital resources available for Irish, echoing Ó Laoire & Harris' (2006) concern regarding the lack of 'high tech learning materials' for Irish (p. 15). Teacher respondents shared: 'There are so many resources available in all other subjects but unfortunately not for Irish', 'I find there is a dearth of material for teaching Irish. I find it very difficult to find Gaeilge resources online' and 'out of all the subjects you have the least choice of resources for Irish. I think the Department of Education are so thin on the ground with actual chunks of resources'. One particular respondent noted how the majority of technology tools were aimed at younger students:

In my experience, most of the online resources that are available through Irish are pitched to lower class and age levels. The availability of online resources as with all other resources tends to take the shape of a triangle or pyramid with the most resources being available at infant class levels and this availability steadily decreasing as the class levels go up.

The most common technology resource teachers use is An Seomra Ranga⁵⁹, where 77% of respondents (n=415) perused this website for material to implement in their lessons. 50% of respondents (n=271) used Focal.ie⁶⁰ (now known as Tearma.ie) which is an English/Irish term base. Thirty five percent (n=189) of respondents used TG Lurgan⁶¹ (an Irish songs resource) and a further 19% (n=101) use the Cúla Caint⁶² iPad applications. Interestingly, very few respondents selected tools such as online dictionaries, grammar checkers and spellcheckers. In fact, comments indicated that respondents were oblivious to these resources as one respondent wrote: 'I was unaware of most of these tools/ sites and after reading the list in this survey I'll definitely be taking a look at some of these and making use of them in my teaching' and another shared: 'I'm shocked there's so much I'm not aware of'. The

⁵⁹ <https://www.seomraranga.com/>

⁶⁰ <http://www.tearma.ie/Home.aspx>

⁶¹ <https://lurgan.biz/tg-lurgan/>

⁶² <https://itunes.apple.com/ie/app/c%C3%BAla-caint/id471062494?mt=8>

following diagram lists the most common technology tools that teachers use in their Irish lessons.

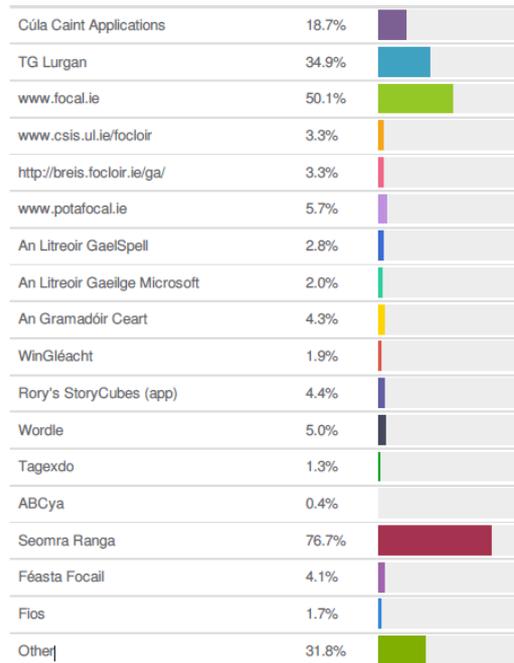


Figure 10.6: Technologies Employed in Irish Language Lessons

Respondents also shared other Irish-language resources they employed in their Irish lessons. Go Animate and digital storytelling also featured in this list, which is depicted below.

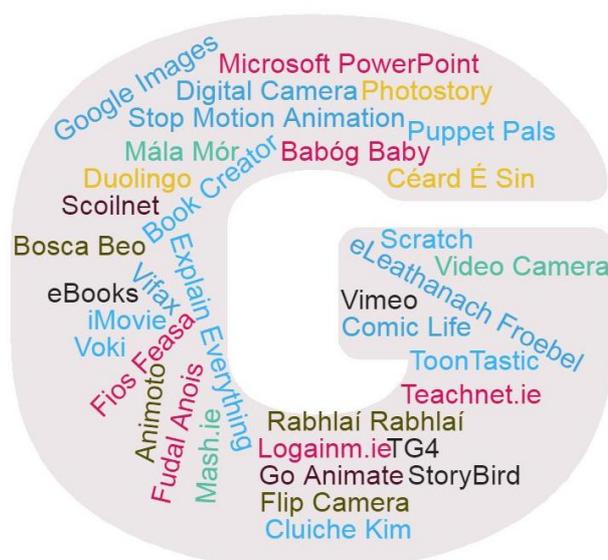


Figure 10.7: Other Irish Language Technologies Teachers Use

I found that nearly half (47%, n=256) of respondents 'almost never' used audio-visual materials such as animations, cartoons and videos in their Irish lessons and only 12% (n=65) used them on a daily or regular basis. TG Lurgan, TG4 and YouTube were the resources most cited by respondents. Eighty five percent (n=378) of respondents were receptive to the idea of using animation, however. Encouragingly, 70% (n=311) of respondents stated that they would feel comfortable facilitating students in the creation of their own animations in Irish class, viewing it as a 'purposeful way of using the language'. Their comments below indicate their interest.

Table 10.6: Respondents Receptiveness to Student-created Animations in Irish Class

<p>The creative element would support and encourage the communicative approach. It would be motivating, engaging and collaborative.</p>	<p>That would be a fantastic way to make the language real for children and bring written stories to life.</p>	<p>Would get them speaking Irish in an engaging way.</p>
<p>They would remember it much more if they created it. Would allow them to explore language.</p>	<p>I am a big fan of using animations in the teaching of the Irish language. It gives children a chance to actually hear themselves speak the language. It's not something a text book offers.</p>	

Indeed, some respondents were already using this approach in Irish and other subjects such as English and Science: 'We have used it to create short animated movies in the Irish language to aid in the speaking and retention of the Irish language with great success', 'I did a series of stop motion animations last year linked with story writing' and 'comic strips are great and recording Irish is a great motivator, it consolidates work in class. Uploading onto blog can help parents at home and gets them interested in Irish!'.

Some respondents were hesitant about this approach, however, stating: 'I would require instructions in English to complete!' and 'I don't know if I'd fancy teaching the children how to do this as Gaeilge. I think many children would be incredibly frustrated by this'. Another teacher stated:

No, this would become an art lesson as well as ICT and as the pupils are already tending to spend too much time doing non academic subjects, I think this would be counter productive. Also, not all have artistic minds and may not enjoy creating something that will be seen by everyone else on a screen!.

10.4.3 BARRIERS TO TECHNOLOGY-INTEGRATED LEARNING

Respondents voiced many of Ertmer's (2005) barriers to technology integration in the classroom including access to skills and resources; access to training and support; and curricular pressures and time constraints. They also listed class size as a barrier and Internet connectivity, with one respondent stating that they were on their sixth broadband provider. The following word cloud lists the most common barriers.

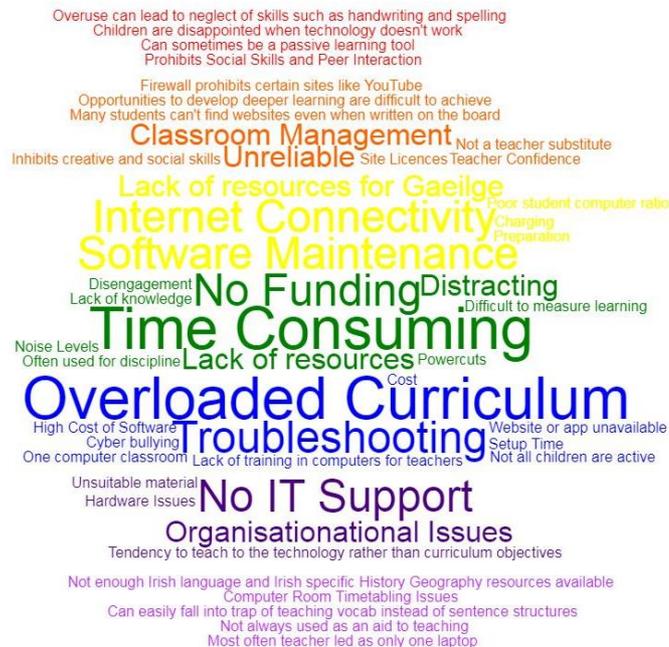


Figure 10.8: Barriers to Technology-Integrated Learning

One particular respondent was in favour of technology integration in the classroom but highlighted the many barriers in her way:

I think technology is the way forward for teaching but the DES need to realise, as teachers, we are not experts in IT but are teachers who use IT for teaching and learning. It frustrates me that we are expected to know and do and maintain so much in the whole area of IT when what schools need is an actual ICT person employed to maintain and update the massive investments school have made in IT.

The classroom teacher echoed this sentiment stating:

The average teacher considers technology very time-consuming...if I wanted to teach a tech-centred lesson, I have no time to be turning on computers. I have no time to be troubleshooting...that's the reality – lack of training, lack of funding, lack of hardware, lack of support is huge. The school has an IT contractor but she's literally doing the basics a lot of the time, fighting fires, and we pay her out of funds that are not allocated to IT...there are no IT funds. Every single course I do with PDST is all in my own time. It's nothing to do with school. And who is going to opt for that? And with the overload of curriculum, there is no time. We have a long way to go before people are really welcoming of it (Interview 2).

10.4.4 IRISH CURRICULUM

All five teachers I interviewed declared their satisfaction with the Irish curriculum, with one teacher stating:

It's functional...a lot of the Irish curriculum focuses on skills which I think is good and I think there is a good emphasis on oral language, which there needs to be. I'm not sure that it translates into every teacher's classroom...every year I feel I'm improving in terms of teaching Irish (Kate, 2015).

Their main goal was that their students could speak in Irish, with one teacher stating: 'We try to teach Irish basically so they can have conversations, it's not lists of words' (Mary, 2015). Another teacher reflected upon her time as a primary school student:

When I was in school, by the end of sixth class I couldn't speak Irish at all... Like I would hope that my kids would be able to speak it. It's not so much the reading side of it, it's more that they can have a conversation (Kate, 2015).

According to my questionnaire respondents, even though the curriculum promotes spoken language and emphasises oral skills above all others, it does not seem to translate to most classrooms, with one teacher stating: 'There is something hugely wrong when children are leaving primary school after 8 years and cannot string a few sentences of Gaeilge together!'. One teacher, who spent 33 years in the classroom, experienced teaching both the former audio-visual curriculum and the current communicative curriculum, and held the existing curriculum in higher regard as he felt it was much more practical:

Tá feabhas mór tagtha air. Tá sé i bhfad níos cáirdiúla ná mar a bhí. Tá níos mó béime ar an teanga labhartha' [It has improved hugely. It is much more approachable compared to what it used to be. There is more emphasis on the spoken language] (Henry, 2015).

He also felt that the content was more child-friendly compared to that of the previous curriculum:

Bhí daltaí ag iarraidh téacs a léamh agus níor thuig siad an méid a bhí á dhéanamh acu. Ach anois tá níos mó béime ar an gcaint agus ar an tuiscint, agus tá sé sin níos fearr [students tried to read text and they did not understand it. Now, there is more emphasis on speaking and on understanding the language, which is much better] (Henry, 2015).

In terms of Irish textbooks, all teachers used different ones and each one had to supplement theirs with a school-designed grammar programme as they seemed to fall short in this area. One teacher emphasised the importance of covering all ten themes twice during the academic year, building upon and reinforcing knowledge and skills learned the first time around:

Caithfidh tú teacht ar ais air agus forbairt a dhéanamh leis níos déanaí...muna dtagann tú ar ais air, beidh sé go léir cailte, ach caithfidh tú a bheith cúramach nach mbeidh sé leadránach dóibh [You have to come back a second time and develop it...they will forget if you do not do this,

but you need to make sure that it does not become boring for them] (Henry, 2015).

The classroom teacher professed several times during the intervention the constant pressure she felt to cover the curriculum, reinforcing similar concerns raised by Applefield et al. (2001) and Sylvester & Greenidge (2009) in my review of literature in chapter 4. Before the intervention even began, she voiced her concern stating: 'the overload of curriculum, there is no time. Like the curriculum is massive...it's just huge (August 2014). She raised it once more at the end of our first iteration: 'I'm really into getting every bit of my curriculum done. I probably should be cutting time off here and there from different things and make time for other things though' (Interview 1). She mentioned it again soon after our second iteration stating:

Time is the issue or that there's a bit of understanding that maybe you're not going to learn as much content, but that you'll get better at conversing in Irish, that's not there at the moment. I have to do my book, the kids buy it. If it goes home with ten out of twenty chapters not done, the parents are going to say 'what's going on? I could leave two to three chapters empty and I wouldn't mind that, but no more than that. You have to cover a certain amount of themes and then you have all your other elements – your grammar, your poems, your spellings. That's all outside of the book. There's a lot to cover (Interview 2).

When I asked her where this pressure came from, she responded:

I mainly want this for myself and also for the teacher who will have them in fourth class. We have a curriculum and a school plan to cover for the year and I suppose this is where most of the pressure comes from. Obviously, an inspector could see the account of learning too, but that's so rare, that doesn't really bother me (Interview 2).

Data emerging from my national teacher questionnaire revealed teachers, in general, were concerned with curriculum coverage and felt technology eroded the limited time they had for their Irish-language lessons. One respondent stated: 'it's good for stimulating interest. Not sure it's the most effective for covering lots of material' and another shared: 'they would enjoy more, but teacher has lots to fit into limited time'.

One particular teacher I interviewed as part of my follow-up questionnaire study held a different perspective, however, where she practised and implemented different parts of the curriculum at the same time:

You've got your English writing, your Irish writing, you've got your drama, you've got music, you've got SPHE [Social, Personal, Health Education] because they have to work in groups...there is art, there is so much, so it's all in the curriculum, it's just a different way of looking at it...from what you should be doing anyway instead of doing it from a book (Kate, 2015).

10.5 CONCLUSION

This chapter conveyed how students' ability in and attitude towards the Irish language were enhanced as a result of our instructional intervention. I explored my national teacher questionnaire data in greater depth and triangulated these data with other data collection instruments. The following chapter summarises my TALES model and the design principles that have emerged from it, enabling other teachers to adopt this innovative approach in their Irish-language learning lessons.

11 CHAPTER ELEVEN: CONCLUSION AND RECOMMENDATIONS

11.1 INTRODUCTION

In this chapter, I summarise this study's main contribution to Irish-language teaching and learning in primary school classrooms, namely the TALES model and its various research outputs. I also reiterate the concerns the teacher conveyed in terms of our instructional intervention and how they were taken into consideration in the design of Irish-language learning activities. In addition, I provide a set of five design principles to help and guide other teachers in implementing TALES in their Irish-language classrooms. Finally, I discuss implementation of TALES within the wider sphere of the educational system and I reiterate the importance of my aligning theory with practice in order to enhance the validity and rigour of my research findings.

11.2 INITIAL CONCERNS OF TEACHER

Littlewood (2006, 2007) lists several criticisms teachers often level against task-based language learning, an approach similar to design-based learning. Amongst the criticisms he includes issues with classroom management, avoidance of the target language, minimal demands on language competence, and conflict with educational values and traditions. The teacher worried about curriculum coverage and questioned whether the amount of language generated by the design tasks justified the large amount of time spent on them. As the intervention progressed, it became clear that TALES enabled students to negotiate all four language skills as they composed their stories on paper before digitally recreating them. Indeed students created learning artefacts that were far beyond the teacher's expectations.

She was also concerned at the outset that students would miss out on learning key language elements represented in textbook chapters. By maintaining the three phases of communicative learning and aligning traditional methods of instruction with the pre-communicative and post-communicative phases, and aligning the innovative approach with the communicative phase, curricular learning objectives were met.

She also felt a loss of control as her students moved freely around the classroom and generated quite a lot of noise as they worked collaboratively in groups. This abated as she became accustomed to this student-centred active approach to language learning and to her role as facilitator. In addition, students settled into this new way of learning and there was a much calmer atmosphere in the classroom as the intervention advanced.

Teachers often lack confidence in conducting communicative activities in the target language due to insufficient proficiency (Littlewood, 2007). The teacher raised this as an issue too. Her level of fluency had also risen by the end of this intervention due to our immersive approach in the classroom. We also found by openly questioning and exploring the language together and with our students, that we set a better example for them as they worked collaboratively with other students. Students expect their teacher to be all-knowing, but when the teacher shares the ‘problem and the experience of solving it’ with her students, it allows students to learn from the teacher ‘not “by doing what teacher says” but “by doing what teacher does”, which is pursuing a ‘problem until it is completely understood’ (Papert, 1993b, p. 115).

11.3 RESEARCH CONTRIBUTION

As discussed in chapter 6, TALES (Technology, Activity, Language, Engagement, Story) is the framework that informed our instructional intervention and was modified iteratively as we progressed through each of our three design cycles. It supports a student-centred, technology-enhanced, design-based, constructionist and collaborative approach to language learning. It can be adopted and adapted by Irish-language teachers to foster a more active, communicative and creative approach to language learning.



Figure 11.1: TALEs Framework

TALES is undergirded by several theoretical and conceptual frameworks as outlined in chapters 2, 5 and 6. The TPACK conceptual framework, in particular, supported Irish-language learning activities through active pedagogical approaches and design-based language activities. In combining this triad of knowledge, TALEs engaged students in innovative language learning activities. Curriculum was upheld through students writing stories around curricular themes and drawing on specific language constructs in the process. Technology learning was supported through students engaging in design activities using constructionist tools as they created digital and animated stories. TALEs integrates all four language skills through the storytelling phase and then maps them to four corresponding multimedia skills during the digital recreation phase, developing language and technology skills in the process.

TALES externalises student thinking whilst they collaboratively create sharable learning artefacts, negotiating meaning and deepening learning in the process. It explicitly lists lesson objectives and learning outcomes associated with curricular themes encased in textbook chapters. It promotes short bursts of instruction and scaffolded learning; storyboarding in dyads and digital recreation in triads; and peer learning opportunities through group work, peer corrections and presentation. Furthermore, TALES incorporates traditional approaches to language learning during pre-communicative and post-communicative learning activities. In this way, through the combination of screens and pixels and paper and pen, students engage with the Irish language at a deeper level. Most importantly, it engages students in the meaningful production of the Irish language, providing them with increased and spontaneous opportunities to speak and write the language through creative writing and digital recreation activities, and all through the medium of Irish.

The TALES model not only offers a possible solution to the problem of underachievement in Irish in English-medium schools, but it is also a powerful and inspiring example of how Irish can be taught and learned in a meaningful fun way. Savignon (1987) believes that the language classroom is a rehearsal for the outside world, but TALES takes a different approach as it brings interests from the outside world into the classroom. Students were intrinsically motivated as they worked on their stories because the learning activity was meaningful to them. They took more initiative and responsibility for their own learning, they actively explored and questioned language and experimented with a host of tools as they brought their ideas and stories to life. Students' showed a greater interest in Irish and demonstrated a more positive attitude towards the language. Their comprehension and written skills improved. While their oral skills also improved and students made more of an attempt to speak in Irish, it was at a slower rate. They also became more digitally fluent as they became more adept at designing and creating, and they developed interpersonal, communicative and problem-solving skills in the process. I feel that TALES has, in fact, fostered an active, communicative, creative and authentic language learning experience for students in the Irish-language classroom.

11.4 RESEARCH OUTPUTS

This study has produced four outputs across three design cycles. Based on McKenney & Reeves' (2012) generic model for conducting design-based research and the R-NEST model (Long & Hall, 2015), these outputs can be categorised as proximal, distal and medial. The proximal output is the designed intervention relating to the local context (Long & Hall, 2015) and includes both the product (learning activities and student artefacts) and the cognitive process (instructional approach) (McKenney & Reeves, 2012; McCandliss et al., 2003). The distal output is the set of design principles which informs future endeavours (Long & Hall, 2015) and 'address the proposed farther reaching impacts of an educational innovation' (McCandliss et al., 2003, p. 15). The medial output encompass the practical resources created for and during the intervention (Long & Hall, 2015).

In this study, the proximal practical output entwines both product and process (Long & Hall, 2015). The first proximal output of TALES is that students were engaged in the production of design artefacts in the form of digital, animated and coded stories revealing their endeavours in Irish-language learning. The second proximal output of TALES is that it demonstrates, through an iterative design process, how TALES can be effectively integrated into the Irish curriculum to enhance the student experience in the Irish-language classroom. The third medial output of TALES is the curricular repository of resources described in chapter 5 such as timetables, lesson plans, learning activities and rubrics. The fourth distal output of TALES is the design framework itself and its 'transferrable ontology of orienting criteria and principles that can be adopted and adapted' (Long & Hall, 2015, p. 575) by other teachers to inform analogous undertakings in similar language classroom settings. These design principles are discussed below.

11.5 DESIGN PRINCIPLES

Since findings cannot be generalised in a DBR study, design principles arising from an intervention must be implemented and tested in various contexts 'with the purpose of ensuring that the same results' occur every time (Plomp, 2007, p. 32). TALES yields a collection of design principles (Edelson, 2002; Reeves et al., 2005) that encapsulate lessons learned during the instructional intervention (Hoadley, 2004) and can be extended 'beyond the specific context' in which they were learned

(Edelson, 2002, p. 116). Design principles are not recipes for success, however, but offer guidelines in implementing TALEs in other classrooms (McKenney et al., 2006). The following five design principles have emerged from TALEs and promote a student-centred, collaborative, technology-enhanced, knowledge-construction learning environment to enhance the Irish-language learning experience in the classroom.

11.5.1 KEY DESIGN PRINCIPLE ONE: TECHNOLOGY

Technology should be viewed as an 'object-to-think-with, that will contribute to the essentially social process of constructing' sharable learning artefacts (Papert, 1993b, p. 182). The STORIES framework will guide the teacher in selecting the appropriate technology tools, especially tools housing image and audio repositories. It is important to sustain student engagement through technology variation in order to continuously challenge students. In this way, learning develops in tandem with challenge level, maintaining the flow experience (Csikszentmihalyi, 1991).

Students learn technologies through timely instruction bursts and through exploring and tinkering with technology tools. They share their discoveries with one another in the process (Sandholtz et al., 1994). They develop digital fluency as they engage in design-based learning activities using constructionist tools. They grow in confidence in their abilities when they experience transfer of learning making learning even more authentic and worthwhile. Not every student is equipped with basic computer skills and this needs to be taken into consideration at the outset, for example, encourage students to locate webpages using child-friendly search engines.

11.5.2 KEY DESIGN PRINCIPLE TWO: ACTIVITY

Activity in the classroom is achieved through collaborative learning, promoting social interaction amongst students and between students and their teacher. This interaction leads to knowledge construction (Applefield et al., 2001). As they compose stories, they adapt to a new way of learning. They learn to embrace uncertainty and to negotiate and converge meaning (Hübscher-Younger & Narayanan, 2003). By enduring this period of 'mental discomfort or cognitive dissonance', students grow and extend their knowledge (Applefield et al., 2001, p. 43). Through careful and subtle questioning and prompting, and more direct

recasting and instruction, the teacher scaffolds their learning and encourages them to persist in their learning endeavours.

Whilst streamed-ability grouping configurations resulted in a more harmonious classroom, learning within groups was superficial compared to mixed-ability groupings as students learned at a deeper level. It may be helpful to stream groups according to similar abilities at the outset, however, until students and their teacher adapt to this new way of learning before moving on to mixed ability groupings. In order to enhance intergroup communication, groups should be kept to three members, if possible. It would be beneficial to incorporate the Ask Three Before Me rule to encourage communication and collaboration, and to use clocks or timers to encourage better time-keeping skills, especially at the beginning. They become less reliant on such tools and strategies as they become more accustomed to this way of learning. The teacher also needs to be aware of group dynamics and engage with students on a regular basis to prevent over-dominant members taking over.

11.5.3 KEY DESIGN PRINCIPLE THREE: LANGUAGE LEARNING

Immersing students in the Irish language is important and translation to English should be avoided, where possible. The teacher facilitates learning through scaffolded instruction and short instruction bursts, providing timely feedback on the quality of their learning and guidance in terms of new language (Maxwell, 2001; Parsons & Taylor, 2011; Kozma, 2011; Gattullo, 2000). Encourage students to use the language within their repertoire and to explore new language using dictionaries and textbooks. It may be helpful to work double sessions into the teaching schedule so as to facilitate collaborative Irish-language learning around technology. In addition, search image repositories graphically and use localised technology wherever possible. Introduce a reward system such as digital badges to motivate students to speak more Irish.

11.5.4 KEY DESIGN PRINCIPLE FOUR: ENGAGEMENT

Students are intrinsically motivated to learn Irish as they need it for their stories. Engagement is enhanced through small group sizes and designing flow experiences into learning activities where optimal learning occurs (Csikszentmihalyi, 1991). Learning needs to be challenging and this can be achieved through sustained

variation of technology tools and through natural curriculum advancement. Encourage reengagement outside of the classroom by inviting students to present their Irish stories created at home.

11.5.5 KEY DESIGN PRINCIPLE FIVE: STORY

Through the act of story writing and digital recreation, students engage in Irish-language learning in a fun, authentic and meaningful way. They have to think about, question, discuss and negotiate various language constructs as they write, edit, revise, construct, reconstruct, record, rerecord, share and reflect upon their stories. They create shareable learning artefacts which they can show to their peers and parents. Students should present their own digital stories as it leads to a greater sense of ownership and pride in their work. It is important to include time for questions at the end to delve deeper into language and technical aspects of their stories. If possible, share their stories in a safe secure environment such as a school blog or dedicated technology platforms such as Scratch, GA or LBT.

Incorporate a story element into short instructional bursts when demonstrating technology tools. Students should be grouped in pairs. They may seem apprehensive at the beginning but they grow to embrace and enjoy the freedom to express themselves and to use their imaginations. The focus should be on story writing and artwork should therefore be kept to a minimum and completed at the end. Encourage peer corrections at the end.

11.6 VALIDITY OF STUDY

A wide gap exists between educational research and practice in general (Penuel et al., 2015). Decades of experimental instructional technology research have provided 'an insufficient foundation of theory and principles to guide practice' (Reeves, 2000, p. 11). DBR can help to 'establish the potential of an innovation', however (Hall et al., 2016, p. 9) as its deployment in the classroom is undergirded by conceptual, theoretical and methodological frameworks (Edelson, 2002; Kelly, 2004; McKenney & Reeves, 2012; Tabak, 2004). This alignment between theory and practice enhances the validity and rigour of data (Confrey, 2006; Hoadley, 2004; Reinking & Bradley, 2008). I paid particular attention to face validity ensuring

students believed they were in a credible learning environment; to content and learning validity ensuring the teacher approved all lesson content and that all language activities supported learning; and to curriculum validity ensuring all activities aligned with curricular components (Reeves, 2011). Furthermore, the iterative nature of DBR mitigates bias and contributes to the 'production of credible evidence' (O'Donnell, 2004, p. 256), by 'arriving at better and better ways to support student learning' (Hoadley, 2004, p. 169) through the triangulation of mixed methods (The Design-Based Research Collective, 2003); through the detailed description of research methods (Hammer & Berland, 2014) and through the researcher consulting with key stakeholders in the learning context (Hall et al., 2016).

I believe that four of the five characteristics of a successful DBR study, espoused by The Design-Based Research Collective (2003) and discussed in chapter 5, have been observed in my study, namely:

1. The intervention was iterative in nature resulting in several design cycles, where each cycle was designed, enacted and analysed (Anderson & Shattuck, 2012; Barab & Squire, 2004; diSessa & Cobb, 2004; Gravemeijer & Cobb, 2006; Joseph, 2004; McKenney & Reeves, 2012; Mehan, 2008; Ormel et al., 2012; Plomp, 2007; Reinking & Bradley, 2008; Sandoval, 2004, 2014; Tabak, 2004; van den Akker, 2007).
2. Design cycles took place in an authentic setting in collaboration with a practitioner who shared an understanding of the problem (Anderson & Shattuck, 2012; Barab & Squire, 2004; Cober et al., Fishman et al., 2004; Fishman et al., 2013; Hall et al., 2016; Hoadley, 2004; McKenney & Reeves, 2012; Penuel et al., 2011; Plomp, 2007; Reeves, 2000, 2006; Reeves et al., 2005; Reeves et al., 2011; Reinking & Bradley, 2008; Shavelson et al., 2003; Tabak, 2004; 2015).
3. Research methods linked processes of enactment to outcomes of interest (Fishman et al., 2004; Hall et al., 2016; Hoadley, 2004; Sandoval, 2014).
4. The new designed learning environment led to improved practice and to the development of learning theories (Barab & Squire, 2004; Collins et al., 2004; diSessa & Cobb, 2004; Fishman et al., 2013; Hoadley, 2004; McKenney & Reeves, 2012; Mehan, 2008; Hoadley, 2005; Ormel et al., 2012; Plomp, 2007; Reeves et al., 2005; Reeves et al., 2011; Reinking & Bradley, 2008; Sandoval, 2014; Shavelson et al., 2003; Sloane, 2006).

The fifth and final characteristic entails implementation, where findings transcend the local context (Barab & Squire, 2004; Fishman et al., 2004; McKenney et al., 2006; McKenney & Reeves, 2012; Ormel et al., 2012; Penuel & Frank, 2016). Even though the teacher continued to use TALES in her teaching the following year and another sixth-class teacher in her school integrated TALES into his Irish lessons, my innovation has not transcended the local context.

Fullan & Donnelly (2013) refer to this as system change, which involves transformation at scale, where the innovation is implemented across the entire educational system and embedded within the learning environment and the learning day (Fullan & Donnelly, 2013). In their systematic review of DBR studies, Anderson & Shattuck (2012) found that while DBR interventions have made a difference in terms of improved learning outcomes and attitudes, they are ‘mostly at the level of small-scale interventions and in the lives of individual teachers and schools’ (p. 24). As Little & Ó Meadhra (1991) reveal, however, ‘success on a small scale, especially when it can be substantiated by careful evaluation, immediately becomes an argument for implementation on a larger scale’ (p. 15).

Nonetheless, adoption of an innovation depends on how well teachers perceive it to fit within student learning objectives and their instructional approaches and beliefs (Roschelle & Penuel, 2006). An innovation resulting from a DBR study is easy to adopt, however, as teachers, students and researchers have participated in its design and its enactment in the reality of a busy classroom (ibid). That said, DBR studies need to specifically address system change (Fullan & Donnelly, 2013) and confront ‘systemic issues of usability, scalability and sustainability’ (Fishman et al., 2004, p. 43). This will ensure that innovations extend beyond the local study to other teachers across schools (ibid). Brown (1992) refers to this as the reality principle, which she defines as the ‘shelf life of educational interventions’ (p. 171). Sandholtz et al. (1994) advocate that teachers need ongoing support in implementation and this is only possible ‘if the larger system in which they are working changes as well’ (p. 21). Lack of support leads to lack of use and the ‘eventual abandonment of the program’ (Brown, 1992, p. 172).

11.7 FUTURE IMPLEMENTATION

Continuous Professional Development (CPD) courses are needed in the area of pedagogical integration of technology across various subjects including Irish. Teachers need to maintain their language skills as well through regular CPD and immersive courses in the Gaeltacht. CPD courses play a crucial role in systemic change (Fishman et al., 2004; Fullan & Donnelly, 2013). I believe TALES could accommodate such courses across language and technology disciplines. Even though this study is concerned with the teaching and learning of Irish at primary school level, it needs to filter upwards through secondary and tertiary levels as well. In fact one questionnaire respondent raised the issue of how Irish is being taught in teacher education programmes:

Graduates from certain Colleges of Education are entering the classroom with a deplorable level of Irish. They have neither the interest in or the ability to teach Irish successfully. Mistakes go uncorrected for too long meaning that there is an un-rectifiable deficit by Rang a Sé. The acceptance, by educators, of a 'hybrid' form of Irish/English is to the detriment of the less dominant Irish language.

Another questionnaire respondent stated:

I think primary teachers are not fluent enough in the language to teach it properly and so gloss over, barely covering it as a subject in school. This is why our children are not doing better at Irish in primary schools.

System change therefore needs to occur at teacher-training level, but the probability that such innovations 'reach the world of educational development and influence the decisions made regarding the formation of teachers are still low' (Urrea, 2002, p. 12). The DES (2015) calls for more opportunities for teachers to innovate, disseminate and collaborate in terms of their use of new technologies and approaches (DES, 2015). I hope to present TALES at conferences such as CESI (Computers in Education Society of Ireland) and other Irish-language and educational technology conferences in the coming year. I also plan to engage with other teachers through those organisations in Ireland that support and promote pedagogical innovation such

as the Professional Development Service for Teacher – Technology in Education⁶³ (PDST-TiE), which supports technology integration in Irish classrooms nationwide. The Festival of Education in Learning and Teaching Excellence⁶⁴ (FÉILTE) is another one that showcases teachers' innovative learning projects. Molfeasa⁶⁵, which means 'hub of knowledge and learning' in English, is an online space connecting researchers and teachers with various research endeavours. The Digital Schools of Distinction⁶⁶ is another initiative and aims to promote, recognise and encourage excellence in the use of technology at primary level. The FÍS⁶⁷ (which means video or vision tale in Irish) Film Project also shares innovative practice. I plan to make contact with these agencies in the coming future to share TALES and disseminate my findings in order to enhance students' experience of Irish-language learning in the classroom.

11.8 FUTURE RECOMMENDATIONS

One of the proximal outputs of the TALES model is the digital and animated stories created by students and teachers. I believe that this productivity could help resolve the problem of limited availability of resources for Irish-language learning, if facilitated correctly by expert Irish-language and primary school teachers. These stories could also be revoiced in other dialects. I found that 85% (n=378) of respondents were receptive to the idea of using animation in their Irish-language lessons and emphasised the importance of using animations of high quality in terms of language and for different learning levels. Respondents stated: 'I feel that the children would be really enthusiastic about learning using animations', 'I would love access to relevant Irish animations based on the themes. I find many resources available are either too easy or too difficult for middle class levels' and 'Irish learning needs to move along with English, maths and other curricular areas in that colourful interactive high-quality resources and lessons need to be available to every teacher'.

⁶³ <https://www.pdsttechnologyineducation.ie/en/>

⁶⁴ <http://www.teachingcouncil.ie/en/News-Events/FEILTE/FEILTE-2016/>

⁶⁵ http://www.ncca.ie/en/Curriculum_and_Assessment/Partnerships/

⁶⁶ <http://www.digitalschools.ie/>

⁶⁷ <http://www.fisfilmproject.ie/>

From the outset, I aligned the design of my digital artefacts with Mayer & Moreno's (2002) cognitive theory of multimedia learning, where people learn better from pictures and words than from words alone. Mayer & Moreno (2002) also outline seven principles for using animation in multimedia instruction and students were prompted to incorporate these into their digital and animated stories. Students were required to include a narration supporting the multimedia and temporal contiguity principles where audio and images were presented together at the same time (Mayer & Moreno, 2002). They had to include text on-screen aligning with the spatial contiguity principle (ibid). I felt the advantage of including narration and text within animations outweighed the redundancy and modality principles which promoted narration in animation only with no on-screen text (ibid). In keeping with the coherence principle, students were encouraged to include suitable music and sound effects (ibid). They were also encouraged to incorporate a more conversational style into their narrations supporting the personalisation principle (ibid).

11.9 FINAL REMARKS

I believe that current approaches to Irish-language instruction emphasise traditional dissociated learning, where 'material is rote learned and treated as meaningless' (Papert, 1993b, p. 47) and where fragmented pieces of curricular knowledge are taught in isolation. It is difficult for students to connect these 'isolated pieces of knowledge' into coherent structures (Papert, 1993a, p. 107). I postulate that this is the reason why teaching Irish in English-medium schools is largely unsuccessful. As Papert (1993) suggests, improving instruction may not necessarily lead to better performance, but adapting the learning environment itself to one of construction and discovery of knowledge can help attain this outcome. Through TALES, students can learn and encounter the Irish language as they need it and create, share and reflect upon it in the process. Furthermore, in their 2014 Horizon report on technology adoption in European primary schools, Johnson et al. (2014) identify the integration of authentic design activities into the curriculum as a challenge. I present TALES to language teachers as a way to integrate design-based learning activities into the Irish curriculum and language curricula in general.

TALES incorporates a set of design conjectures based on constructionist and socio-constructivist learning theories, which undergird language learning activities in this classroom. These conjectures promote a student-centred, collaborative, technology-enhanced, knowledge-construction environment. They include fostering language-in-use in an integrative, communicative, meaningful way around story composition; the pedagogical application of technology through constructionist tools and design-based learning activities around story recreation; and collaborative learning through scaffolded instruction and peer learning. As demonstrated in chapters 7-9, each conjecture was refined and reified iteratively and led to an improvement in students' language ability and attitude, thereby enhancing their overall experience in the Irish-language classroom.

A set of design requirements also guided learning activities in the classroom. These encompass language, learning activities, and technology tools. Students are encouraged to use language they already knew and to explore new language. They are encouraged to question and negotiate language meaning and form in a social way with both the teacher and each other. In addition, activities align with curricular objectives, while technology applications align with my STORIES framework. Nonetheless, Biesta & Burbules (2003) uphold that educational researchers cannot provide educational practitioners with 'firm solutions' (p. 81) or 'recipes' (p. 111) to enhance practice as every educational situation is unique. We can only 'hope for "instruments" that can help us in the never-ending process of dealing with educational problems' (p. 81).

An innovation is only usable when it is adaptable, enactable and sustainable, however (Fishman & Krajcik, 2003). I believe that I have specified this instructional intervention in enough detail so that other teachers can adopt and adapt TALES in their Irish-language lessons (Fishman & Krajcik, 2003; Kelly, 2004) and I hope that it will continue to 'be refined as part of an evolving design research process' (Bielaczyc, 2013, p. 263). I feel that TALES provides opportunities for 'honest teaching relationships' where 'the line between learners and teachers can fade' (Papert, 1993b, p. 180) and it enables students to learn in a personally meaningful way, taking 'ownership of the process of understanding' (Hooper, 1996, p. 250). TALES sustains student engagement in Irish-language learning through a variation of technologies and active pedagogical approaches, while maintaining a focus on

storytelling activities, while retaining curricular objectives and the communicative approach to Irish-language learning.

As aforementioned, the teacher expressed a degree of scepticism prior to the beginning of the study regarding their ability to engage in technology effectively and to participate in group work. By the end of this study, the teacher was impressed with their progress in terms of both language and technology learning, as well as with their ability to coach and learn from one another. She continued to employ TALES in her teaching thereafter, demonstrating its practicality and worth. She has shared her knowledge with other colleagues across four summer CPD courses and has guided a sixth-class teacher in her school in adopting TALES in his Irish lessons. Harris (2005) believes innovative solutions are required to bring 'Irish-language registers appropriate to many situations of interest' to students (p. 975). I believe I have achieved this in my study.

References

- Ackermann, E. K. (1996). Perspective-taking and object construction: Two keys to learning. In Y.B Kafai & M. Resnick (Eds.) *Constructionism in practice: designing, thinking, and learning in a digital world*. New Jersey: Lawrence Erlbaum Associates.
- Ackermann, E. K. (2001). Language games, digital writing, emerging literacies: Enhancing kids' natural gifts as narrators and notators. *Information and Communication Technologies in Education*, 31-38.
- Ackermann, E. K. (2002). Piaget's constructivism, Papert's constructionism: What's the difference? Available at:
<http://learning.media.mit.edu/content/publications/EA.Piaget%20-%20Papert.pdf>
[Accessed: 26 November 2015]
- Ackermann, E. K. (2004). Constructing knowledge and transforming the world. In M. Tokoro & L. Steels (Eds.) *A learning zone of one's own: sharing representations and flow in collaborative learning environments*. Amsterdam, Berlin, Oxford, Tokyo, Washington, DC: IOS Press.
- Ainsworth, S. (2008). How do animations influence learning? In D. H. Robinson & G. Schraw (Eds.) *Current perspectives on cognition, learning, and instruction: Recent innovations in educational technology that facilitate student learning*. Charlotte, NC: Information Age Publishing.
- Ammar, A. & Spada, N. (2006). One size fits all?: Recasts, prompts, and L2 learning. *Studies in Second Language Acquisition*, 28(04), 543-574.
- Anderson, T. & Shattuck, J. (2012). Design-based research: A decade of progress in education research?. *Educational Researcher*, 41(1), 16-25.
- Applebee, A. N. & Langer, J. A. (1983). Instructional scaffolding: Reading and writing as natural language activities. *Language Arts*, 60(2), 168-175.
- Applefield, J. M., Huber, R. & Moallem, M. (2001). Constructivism in theory and practice: Toward a better understanding. *The High School Journal*, 84.
- Azevedo, F. S. (2013). The tailored practice of hobbies and its implication for the design of interest-driven learning environments. *Journal of the Learning Sciences*, 22(3), 462-510.
- Bahari, S. F. (2010). Qualitative versus quantitative research strategies: Contrasting epistemological and ontological assumptions. *Jurnal Teknologi*, 52(1), 17-28.
- Bangert-Drowns, R. L. & Pyke, C. (2002). Teacher ratings of student engagement with educational software: An exploratory study. *Educational Technology Research and Development*, 50(2), 23-37.
- Bannan, B. (2007). The integrative learning design framework: An illustrated example from the domain of instructional technology. In T. Plomp & N. Nieveen (Eds.) *An introduction to educational design research. Proceedings of the Seminar Conducted at the East China Normal University [Z]*. Shanghai: SLO-Netherlands Institute for Curriculum Development.
- Barab, S. (2006). Design-based research: A methodological toolkit for the learning scientist. *The Cambridge Handbook of the Learning Sciences (CHLS)*, 153-169. New York: Cambridge University Press.
- Barab, S., Dodge, T., Thomas, M. K., Jackson, C. & Tuzun, H. (2007). Our designs and the social agendas they carry. *Journal of the Learning Sciences*, 16(2), 263-305.
- Barab, S. A. & Kirshner, D. (2001). Guest editors' introduction: Rethinking methodology in the learning sciences. *The Journal of the Learning Sciences*, 10(1-2), 5-15.
- Barab, S. & Squire, K. (2004). Design-based research: Putting a stake in the ground. *The Journal of the Learning Sciences*, 13(1), 1-14.
- Barber, M., Donnelly, K. & Rizvi, S. (2012). Oceans of innovation. The Atlantic, the Pacific, global leadership and the future of education. *Educational Studies*, (4), 109-185.

- Barbour, R. S. & Schostak, J. (2005). Interviewing and focus groups. In B. Somekh & C. Lewin (Eds). *Research Methods in the Social Sciences*. London: Sage Publications Ltd.
- Barrett, H. (2006). Researching and evaluating digital storytelling as a deep learning tool. *Technology and Teacher Education Annual*, 1.
- Barron, B. (2000). Achieving coordination in collaborative problem-solving groups. *The Journal of the Learning Sciences*, 9(4), 403-436.
- Barron, B. & Engle, R. (2007). Analyzing data derived from video records. In S. J. Derry (Ed). *Guidelines for video research in education: Recommendations from an expert panel*. Available at: <http://drdc.uchicago.edu/what/video-research-guidelines.pdf> [Accessed: 11 November 2015].
- Barron, B. J., Schwartz, D. L., Vye, N. J., Moore, A., Petrosino, A., Zech, L. & Bransford, J. D. (1998). Doing with understanding: Lessons from research on problem-and project-based learning. *Journal of the Learning Sciences*, 7(3-4), 271-311.
- Bates, A. W. & Poole, G. (2003). *Effective teaching with technology in higher education: Foundations for success*. Jossey-Bass, San Francisco.
- Baumann, J., Blachowicz, C., Bates, A., Cieply, C., Manyak, P., Peterson, H., Davis, J., Arner, J., & Graves, M. (2007). The development of a comprehensive vocabulary instruction program for nine- to eleven-year-old children using a design experiment approach. In T. Plomp & N. Nieveen (Eds). *Educational design research – Part B: Illustrative cases*. Enschede, the Netherlands: SLO.
- Becker, H. J. (2000). The “exemplary teacher” paper - How it arose and how it changed its author's research program. *Contemporary Issues in Technology and Teacher Education*, 1(2), 294-301.
- Bell, P. (2004). On the theoretical breadth of design-based research in education. *Educational Psychologist*, 39(4), 243-253.
- Berland, M., Martin, T., Benton, T., Petrick Smith, C. & Davis, D. (2013). Using learning analytics to understand the learning pathways of novice programmers. *Journal of the Learning Sciences*, 22(4), 564-599.
- Berry, M. (2013). *Computing in the national curriculum: A guide for primary teachers*. UK: Computing at School. NAACE.
- Betrancourt, M. (2005). The animation and interactivity principles in multimedia learning. In R. E. Mayer (Ed). *The Cambridge handbook of multimedia learning*, 287-296.
- Bielaczyc, K. (2013). Informing design research: Learning from teachers' designs of social infrastructure. *Journal of the Learning Sciences*, 22(2), 258-311.
- Biesta, G. J. J. & Burbules, N. C. (2003). *Pragmatism and educational research*. Lanham, MD: Rowman and Littlefield.
- Bloome, D. & Green, J. (2015). The social and linguistic turns in studying language and literacy. *The Routledge Handbook of Literacy Studies*.
- Blumenfeld, P. C., Kempler, T. M. & Krajcik, J. S. (2006). Motivation and cognitive engagement in learning environments. In R. K. Sawyer (ed.). *The Cambridge handbook of the learning sciences*, 475-504. New York: Cambridge University Press.
- Blumenfeld, P. C., Soloway, E., Marx, R. W., Krajcik, J. S., Guzdial, M. & Palincsar, A. (1991). Motivating project-based learning: Sustaining the doing, supporting the learning. *Educational Psychologist*, 26 (3&4), 369-398.
- Bogard, J. M. & McMackin, M. C. (2012). Combining traditional and new literacies in a 21st-Century writing workshop. *The Reading Teacher*, 65(5), 313-323.
- Boschman, F., McKenney, S. & Voogt, J. (2015). Exploring teachers' use of TPACK in design talk: The collaborative design of technology-rich early literacy activities. *Computers and Education*, 82, 250-262.
- Bransford, J. D., Barron, B., Pea, R. D., Meltzoff, A., Kuhl, P., Bell, P., Stevens, R.,

- Schwartz, D. L., Vye, N., Reeves, B., Roschelle, J. & Sabelli, N. H. (2006). Foundations and opportunities for an interdisciplinary science of learning. In R. K. Sawyer, (Ed.). *The Cambridge Handbook of the Learning Sciences*, 23-34. New York: Cambridge University Press.
- Bransford, J., Brown, A., & Cocking, R. (2000). How people learn: brain, mind, experience, and school. Washington DC: National Academy Press.
- Braun, V. & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77-101.
- Braun, V. & Clarke, V. (2012). Thematic analysis. In H. Cooper, P. M. Camic, D. L. Long, A. T. Panter, D. S. Rindskopf & K. J. Sher (Eds). *APA handbook of research methods in psychology: Vol. 2: Research designs: Quantitative, qualitative, neuropsychological, and biological*. Washington, DC: American Psychological Association.
- Brennan, K. & Resnick, M. (2012). New frameworks for studying and assessing the development of computational thinking. In *Proceedings of the 2012 Annual Meeting of the American Educational Research Association (AERA)*, Vancouver, Canada, (1), 25.
- Bressan, E. & Cribb, V. M. (2007). Group project work in higher education: What it is and what it is not. In M. Conrick & M. Howard (Eds.). *From applied linguistics to linguistics applied: Issues, practices, trends. British Studies in Applied Linguistics*, 22.
- British Educational Research Association (BERA) (2004). Revised ethical guidelines for educational research. Southwell, Notts: British Educational Research Association.
- Brown, A. L. (1992). Design experiments: Theoretical and methodological challenges in creating complex interventions in classroom settings. *The Journal of the Learning Sciences*, 2, 141-178.
- Bruckman, A. & Resnick, M. (1996). The MediaMOO project: Constructionism and professional community. In Y. B. Kafai & M. Resnick (Eds.) *Constructionism in practice: designing, thinking, and learning in a digital world*. New Jersey: Lawrence Erlbaum Associates.
- Bruner, J. (1981). The social context of language acquisition. *Language and Communication*, 1(2), 155-178.
- Bruner, J. (2004). Life as narrative. *Social Research*, 71(3), 691-710.
- Bunreacht na hÉireann (1937). *Constitution of Ireland*. Dublin: Government Publications. Available at: https://www.constitution.ie/Documents/Bhunreacht_na_hEireann_web.pdf [Accessed: 12 February 2017].
- Butler, D., Leahy, M., Shiel, G. & Cosgrove, J. (2013). *Building towards a learning society: A national digital strategy for schools*. Dublin: Educational Research Centre.
- Canadian Institutes of Health Research (CIHR), Natural Sciences and Engineering Research Council of Canada (NSERC) and Social Sciences and Humanities Research Council of Canada (SSHRC) (2010). *Tri-council policy statement: Ethical conduct for research involving humans*. Ottawa: Interagency Secretariat on Research Ethics, on behalf of the Canadian Institutes of Health Research, Natural Sciences and Engineering Research Council of Canada and the Social Sciences and Humanities Research Council of Canada.
- Carver, S. M. (2006). Assessing for deep understanding. In R. K. Sawyer (Ed.). *The Cambridge Handbook of the Learning Sciences*. New York: Cambridge University Press.
- Cazden, C. (1979). Peekaboo as an instructional model: Discourse development at home and at school. *Papers and Reports on Child Language Development*, 17, 1-31.
- Cheema, J. R. (2014). A review of missing data handling methods in education research.

- Review of Educational Research*, 84(4), 487-508.
- Chung, S. K. (2007). Art education technology: Digital storytelling. *Art Education*, 60(2), 17-22.
- Cober, R., Tan, E., Slotta, J., So, H. J. & Könings, K. D. (2015). Teachers as participatory designers: Two case studies with technology-enhanced learning environments. *Instructional Science*, 43(2), 203-228.
- Cohen, V. L. (2014). Learning styles and technology in a ninth-grade high school population. *Journal of Research on Computing in Education*, 33, 355-366.
- Cohen, L., Manion, L. & Morrison, K. (2011). *Research methods in education*. London: Routledge.
- Collins, A. (2006). Cognitive apprenticeship. In R. K. Sawyer (Ed.) *The Cambridge Handbook of the Learning Sciences*. New York: Cambridge University Press.
- Collins, A., Joseph, D. & Bielaczyc, K. (2004). Design research: Theoretical and methodological issues. *Journal of the Learning Sciences*, 13(1), 15 – 42.
- Confrey, J. (2006). The evolution of design studies as methodology. In R. K. Sawyer (Ed.) *The Cambridge Handbook of the Learning Sciences*. New York: Cambridge University Press.
- Corden, A. & Sainsbury, R. (2006). *Using verbatim quotations in reporting qualitative social research: Researchers' views*. University of York: Social Policy Research Unit.
- Creswell, J. W. (2003). *Qualitative inquiry and research design*. Thousand Oaks: Sage.
- Creswell, J. W. (2010). *Research design: Qualitative, quantitative, and mixed methods approaches*. Thousand Oaks: Sage.
- Csikszentmihalyi, M. (1991). *Flow: the psychology of optimal experience*. New York: Harper Collins.
- Csikszentmihalyi, M. (1996). *Creativity: The psychology of discovery and invention*. New York: Harper Collins.
- Cummins, J. (2008). Technology, literacy, and young second language learners: Designing educational futures. *Technology-mediated learning environments for young English learners: Connections in and out of school*, 61-98.
- Davis, E. A. & Miyake, N. (2004). Explorations of scaffolding in complex classroom systems. *Journal of the Learning Sciences*, 13(3), 265-272.
- Dede, C. (2000). Emerging influences of information technology on school curriculum. *Journal of Curriculum Studies*, 32(2), 281-303.
- Dede, C. (2004). If design-based research is the answer, what is the question? A commentary on Collins, Joseph, and Bielaczyc; diSessa and Cobb; and Fishman, Marx, Blumenthal, Krajcik, and Soloway in the JLS Special Issue on Design-Based Research. *The Journal of the Learning Sciences*, 13(1), 105-114.
- Department of Children and Youth Affairs (DCYA) (2012). *Guidance for developing ethical research projects involving children*. Dublin: Government Publications. Available at: <http://www.education.ie/en/Publications/Statistics/Data-on-Individual-Schools/> [Accessed 14 June 2014].
- Department of Community, Rural and Gaeltacht Affairs (2010). *20-year strategy for the Irish language 2010-2030*. Dublin: Government Publications.
- Department of Education and Science (DES) (1999). *Curaclam na bunscoile: Gaeilge*. Dublin: Government Publications.
- Department of Education and Science (DES) (1999a). *Curaclam na bunscoile: Treoirlínte do mhuinteoírí*. Dublin: Government Publications.
- Department of Education and Science (DES) (1999b). *Primary school curriculum: Introduction*. Dublin: Government Publications.
- Department of Education and Science (DES) (2006). *Language education policy profile: Country report, Ireland*. Dublin: Government Publications.
- Department of Education and Science (DES) (2007). *Language education policy profile 2005*

- 2007: Ireland. Language Policy Division Strasbourg. Dublin: Government Publications.
- Department of Education and Science (DES) (2007a). *Irish in the primary school: Inspectorate evaluation studies*. Dublin: Government Publications.
- Department of Education and Science (DES) (2013). *Chief inspector's report 2010-2012: Promoting the quality of learning*. Dublin: Government Publications.
- Department of Education and Skills (DES) (2008). *ICT in Schools*. Dublin, Ireland.
- Department of Education and Skills (DES) (2011). *Literacy and numeracy for learning and life: The national strategy to improve literacy and numeracy among children and young people, 2011-2020*. Dublin: Government Publications.
- Department of Education and Skills (DES) (2015). *Digital strategy for schools 2015-2020: Enhancing teaching, learning and assessment*. Dublin: Government Publications.
- Derry, S. J., Hickey, D. & Koschmann, T. (2007). Ethical concerns in video data collection. In S. J. Derry (Ed), *Guidelines for video research in education: Recommendations from an expert panel*. Available at: <http://drdc.uchicago.edu/what/video-research-guidelines.pdf> [Accessed 11 November 2015].
- Derry, S. J., Pea, R. D., Barron, B., Engle, R. A., Erickson, F., Goldman, R., Hall, R., Koschmann, T., Lemke, J. L., Sherin, M. G. & Sherin, B. L. (2010). Conducting video research in the learning sciences: Guidance on selection, analysis, technology, and ethics. *Journal of the Learning Sciences*, 19(1), 3-53.
- Devitt, A., Condon, J., Dalton, G., O'Connell, J. & Ní Dhuinn, M. (2016). An maith leat an Ghaeilge? An analysis of variation in primary pupil attitudes to Irish in the Growing up in Ireland study. *International Journal of Bilingual Education and Bilingualism*, 1-13.
- Dewey, J. (1910). *How we think*. Boston, New York, Chicago: D. C. Heath and Co.
- diSessa, A. A. (2006). A history of conceptual change research: Threads and fault lines. In R. K. Sawyer (Ed.), *The Cambridge Handbook of the Learning Sciences*. New York: Cambridge University Press.
- diSessa, A. A. & Cobb, P. (2004). Ontological innovation and the role of theory in design experiments. *The Journal of the Learning Sciences*, 13(1), 77 - 103.
- Dogan, B. & Robin, B. (2008). Implementation of digital storytelling in the classroom by teachers trained in a digital storytelling workshop. In *Society for Information Technology & Teacher Education International Conference (902-907)*. Association for the Advancement of Computing in Education (AACE).
- Dörnyei, Z. (1998). Motivation in second and foreign language learning. *Language Teaching*, 31(03), 117-135.
- Dörnyei, Z. (2003). *Questionnaires in second language research: Construction, administration, and processing*. New Jersey: Lawrence Erlbaum Associates.
- Dörnyei, Z. (2007). *Research methods in Applied Linguistics*. Oxford: Oxford University Press.
- Dörnyei, Z. & Guilloteaux, M. (2008). Motivating language learners: A classroom-oriented investigation of the effects of motivational strategies on student motivation. *TESOL quarterly*, 42(1), 55-77.
- DuFon, M. A. (2002). Video recording in ethnographic SLA research: Some issues of validity in data collection. *Language, Learning and Technology*, 6 (1), 40-63.
- Dwyer, F. & Dwyer, C. (2006). Effect of cognitive load and animation on student achievement. *International Journal of Instructional Media*, 33(4), 379-389.
- Edelenbos, P. (2005). *Foreign language assessment cultures: Policies and practices in European Union countries*. Study on behalf of the Dutch Ministry of Education. Science and Culture. Groningen: E²LS.
- Edelenbos, P., Johnstone, R. & Kubanek, A. (2006). *The main pedagogical principles*

underlying the teaching of languages to very young learners. Brussels: European Commission, Education and Culture, Culture And Communication Multilingualism Policy.

- Edelenbos, P. & Suhre, C. J. (1994). A comparison of courses for English in primary education. *Studies in Educational Evaluation*, 20(4), 513-534.
- Edelson, D. C. (2002). Design research: What we learn when we engage in design. *The Journal of the Learning Sciences*, 11(1), 105-121.
- Edelson, D. C. & Reiser, B. J. (2006). Making authentic practices accessible to learners: Design challenges strategies. In R. K. Sawyer (Ed.), *The Cambridge Handbook of the Learning Sciences*. New York: Cambridge University Press.
- Educational Research Centre (ERC) (2016). *Triail Ghaeilge Dhroim Conrach do scoileanna rialta (TGD-R)*. Available at: <http://www.erc.ie/test-sales/achievement-tests/gaeilge-learnh-eisteacht/> [Accessed: 17 March 2016].
- Ertmer, P. A. (1999). Addressing first-and second-order barriers to change: Strategies for technology integration. *Educational Technology Research and Development*, 47(4), 47-61.
- Ertmer, P. A. (2005). Teacher pedagogical beliefs: The final frontier in our quest for technology integration?. *Educational Technology Research and Development*, 53(4), 25-39.
- Ertmer, P. A. & Ottenbreit-Leftwich, A. T. (2010). Teacher technology change: How knowledge, confidence, beliefs, and culture intersect. *Journal of Research on Technology in Education*, 42(3), 255-284.
- Eskicioglu, A. M. & Kopec, D. (2003). The ideal multimedia-enabled classroom: Perspectives from Psychology, Education, and Information Science. *Journal of Educational Multimedia and Hypermedia*, 12(2), 199-221.
- Evard, M. (1996). A community of designers: Learning through exchanging questions and answers. In Y. B. Kafai & M. RESNICK (Eds.), *Constructionism in practice: Designing, thinking, and learning in a digital world*. New Jersey: Lawrence Erlbaum Associates.
- Eysink, T. H. & de Jong, T. (2012). Does instructional approach matter? How elaboration plays a crucial role in multimedia learning. *Journal of the Learning Sciences*, 21(4), 583-625.
- Felzmann, H., Sixsmith, J., O'Higgins, S., Ni Chonnachtaigh, S. & Nic Gabhainn, S. (2010). *Ethical review and children's research in Ireland*. Office of the Minister for Children and Youth Affairs. Dublin: Government Publications. Available at: www.dcy.gov.ie/documents/publications/Ethical_Review_and_Childrens_Research_in_Ireland_Report.pdf [Accessed: 5 June 2013].
- Fiontar (2009). *20-year strategy for the Irish language: Prepared for the Department of Community, Rural and Gaeltacht Affairs*. Dublin City University.
- Fishman, B. J. & Krajcik, J. (2003). What does it mean to create sustainable science curriculum innovations? A commentary. *Science Education*, 87(4), 564-573.
- Fishman, B., Marx, R. W., Blumenfeld, P., Krajcik, J. & Soloway, E. (2004). Creating a framework for research on systemic technology innovations. *The Journal of the Learning Sciences*, 13(1), 43-76.
- Fishman, B. J., Penuel, W. R., Allen, A. R., Cheng, B. H. & Sabelli, N. (2013). Design-based implementation research: An emerging model for transforming the relationship of research and practice. *National Society for the Study of Education*, 112(2), 136-156.
- Flewitt, R., Pahl, K. & Smith, A. (2015). Methodology matters. *Literacy*, 49(1), 1-2.
- Flyman Mattsson, A. (1999). Students' communicative behaviour In a foreign language classroom. *Working Papers, Lund University, Dept. of Linguistics*, 47, 39-57.
- Fullan, M. (2013). *Stratosphere: Integrating technology, pedagogy, and change knowledge*. Pearson Canada.

- Fullan, M. & Donnelly, K. (2013). *Alive in the swamp: Assessing digital innovations in education*. London: NESTA. Available at: www.nesta.org.uk/library/documents/Alive_in_the_Swamp.pdf [Accessed: 12 January 2016]
- Gagné, R. M. (1985). *The conditions of learning and theory of instruction*. New York, NY: Holt, Rinehart and Winston.
- Gall, M. D., Gall, J. P. & Borg, W. R. (1996). *Educational research: An introduction*. New York: London.
- Gargarian, G. (1996). The art of design. In Y. B. Kafai & M. Resnick (Eds.) *Constructionism in practice: designing, thinking, and learning in a digital world*. New Jersey: Lawrence Erlbaum Associates.
- Gattullo, F. (2000). Formative assessment in ELT primary (elementary) classrooms: An Italian case study. *Language Testing*, 17(2), 278-288.
- Gee, J.P. (2012). The old and the new in the new digital literacies. *The Educational Forum*, 76(4), 418-420.
- Gee, J. P. (2015). *The new literacy studies*. The Routledge Handbook of Literacy Studies.
- Gelmini-Hornsby, G., Ainsworth, S. & O'Malley, C. (2011). Guided reciprocal questioning to support children's collaborative storytelling. *International Journal of Computer-Supported Collaborative Learning*, 6(4), 577-600.
- Gibbs, G. R. (2007). Analyzing qualitative data. In U. Flick (Ed) *The SAGE qualitative research kit*. London: SAGE Publications Ltd.
- Gilbert, S. W. (2002). The beauty of low-threshold applications. *Campus Technology*. Available at: <http://campustechnology.com/articles/2002/02/the-beauty-of-low-threshold-applications.aspx> [Accessed: 10 October 2016]
- Gillen, J. & Barton, D. (2010). *Digital literacies: A research briefing by the technology enhanced learning phase of the TLRP-TEL (Teaching and Learning Research Programme. Technology Enhanced Learning Programme)*. London: London Knowledge Lab, Institute of Education.
- Golafshani, N. (2003). Understanding reliability and validity in qualitative research. *The Qualitative Report*, 8(4), 597-606.
- Goldbart, J. & Hustler, D. (2005). Ethnography. In B. Somekh & C. Lewin (Eds) *Research methods in the social sciences*. London: Sage.
- Goldman, R. (2007). Video representations and the perspectivity framework: Epistemology, ethnography, evaluation, and ethics. In R. Goldman, R. Pea, B. Barron & S. J. Derry (Eds), *Video research in the Learning Sciences*. New York: Routledge.
- Goldman, R., Erickson, F., Lemke, J. & Derry, S. (2007). Selection in video. In S. J. Derry (Ed), *Guidelines for video research in education: Recommendations from an expert panel*. Available at: <http://drdc.uchicago.edu/what/video-research-guidelines.pdf> [Accessed 11 November 2015].
- Goldman, S. & McDermott, R. (2007). Staying the course with video analysis. In R. Goldman, R. Pea, B. Barron & S. J. Derry (Eds), *Video research in the Learning Sciences*. New York: Routledge.
- Graham, S. & Perin, D. (2007). *Writing next: Effective strategies to improve writing of adolescents in middle and high schools*. Carnegie Corporation of New York.
- Gravemeijer, K. & Cobb, P. (2006). Design research from a learning design perspective. In J. Van den Akker, K. Gravemeijer, S. McKenney & N. Nieveen (Eds.), *Educational Design Research*. London: Routledge.
- Grayson, H., Houghton, E., O'Donnell, S. & Sargent, C. (2014). *Curriculum structures and stages in primary education: Audit of policy across jurisdictions. Key Findings Summary*. Slough: NFER.
- Gredler, M. & Shields, C. (2004). Does no one read Vygotsky's words? Commentary on Glassman. *Educational Researcher*, 33(2), 21-25.

- Gredler, E. M. (2009). Hiding in plain sight: The stages of mastery/self-regulation in Vygotsky's cultural-historical theory. *Educational Psychologist*, 44(1), 1–19.
- Gredler, E. M. (2012). Understanding Vygotsky for the classroom: Is it too late? *Educational Psychology Review*, 24, 113–131.
- Greene, J. C., Kreider, H. & Mayer, E. (2005). Combining qualitative and quantitative methods in social inquiry. In B. Somekh & C. Lewin (Eds) *Research Methods in the Social Sciences*. London: Sage.
- Greeno, J. G. (2006). Learning in activity. In R. K. Sawyer (Ed.), *The Cambridge Handbook of the Learning Sciences*. New York: Cambridge University Press.
- Gros, B. (2002). Knowledge construction and technology. *Journal of Educational Multimedia and Hypermedia*, 11(4), 323-344.
- Guest, G. S., Namey, E. E. & Mitchell, M. L. (2012). *Collecting qualitative data: A field manual for applied research*. Thousand Oaks: Sage.
- Guilloteaux, M. J. & Dörnyei, Z. (2008). Motivating language learners: A classroom-oriented investigation of the effects of motivational strategies on student motivation. *TESOL Quarterly*, pp. 55-77.
- Guttormsen, S. S. & Krueger, H. (2001). Empirical research on the effect of dynamic media for information presentation. In *Proceedings of the International Workshop on Interactive Computer Aided Learning-Experiences and Visions*.
- Guzdial, M. (1994). Software-realized scaffolding to facilitate programming for science learning. *Interactive Learning Environments*, 4(1), 1-44.
- Hall, R. (2007). Strategies for video recording: Fast, cheap, and (mostly) in control. In S. J. Derry (Ed), *Guidelines for video research in education: Recommendations from an expert panel*. Available at: <http://drdc.uchicago.edu/what/video-research-guidelines.pdf> [Accessed: 11 November 2015].
- Hall, T. (2011). ICT: Inspiring and creative technology. *Education Matters*. Available at: http://educationmatters.ie/em_news/ict-inspiring-and-creative-technology/ [Accessed: 12 October 2016].
- Hall, T. (2012). Emplotment, embodiment, engagement: Narrative technology in support of physical education, sport and physical activity. *Quest*, 64(2), 105-115.
- Hall, T. & Long, B. (2012). From digital literacy to digital narrativity; from reflective practice to narrative practice: Digital storytelling in education. *Narrative Matters 2012: Life and Narrative*. The American University of Paris.
- Hall, T., Long, B. T., Flanagan, E., Flynn, P. & Lenaghan, J. (2016). Design-based research as intelligent experimentation: Towards systematising the conceptualisation, development and evaluation of digital learning in schools. In *Handbook on Digital Learning for K-12 Schools*. Springer, Cham.
- Hammer, D. & Berland, L. K. (2014). Confusing claims for data: A critique of common practices for presenting qualitative research on learning, *Journal of the Learning Sciences*, 23(1), 37-46.
- Harris, A., Rick, J., Bonnett, V., Yuill, N., Fleck, R., Marshall, P. & Rogers, Y. (2009). Around the table: Are multiple-touch surfaces better than single-touch for children's collaborative interactions?. *Proceedings of the 9th International Conference on Computer Supported Collaborative Learning*, International Society of the Learning Sciences, 1, 335-344.
- Harris, J. (1982). Achievement in spoken Irish at the end of primary school. *The Irish Journal of Education/Iris Eireannach an Oideachais*, 85-116.
- Harris, J. (1988). Spoken Irish in the primary school system. *International Journal of the Sociology of Language*, (70), 69-88.
- Harris, J. (2005). The role of ordinary primary schools in the maintenance and revival of Irish. *Proceedings of the 4th International Symposium on Bilingualism*, Somerville, MA: Cascadilla Press.
- Harris, J. (2007). National trends in achievement in Irish listening at primary level: A

- challenge for language revitalisation and language policy. In M. Conrick & M. Howard (Eds.), *From applied linguistics to linguistics applied: Issues, practices, trends*. British Studies in Applied Linguistics, 22.
- Harris, J. (2009). Late-stage refocusing of Irish-language programme evaluation: Maximizing the potential for productive debate and remediation. *Language Teaching Research*, 13(1), 55-76.
- Harris, J., Forde, P., Archer, P., Fhearaille, S. N. & O'Gorman, M. (2006). *Irish in primary schools: Long-term national trends in achievement*. Department of Education and Science. Available at: http://www.linguae-celticae.org/dateien/Irish_in_Primary_Schools.pdf [Accessed: 28 February 2013].
- Harris, J. & Murtagh, L. (1999). *Teaching and learning Irish in primary schools: A review of research and development*. Dublin: Institiúid Teangeolaíochta Éireann.
- Harris, J. & Ó Duibhir, P. (2011). *Effective language teaching: A synthesis of research*. Dublin: NCCA.
- Harrison III, H. L. & Hummell, L. J. (2010). Incorporating animation concepts and principles in STEM education. *The Technology Teacher*, 69(8), 20-26.
- Hattie, J. A. C. (2009). *Visible learning: A synthesis of 800+ meta-analyses on achievement*. London: Routledge.
- Hernández-Ramos, P. & De La Paz, S. (2009). Learning History in middle school by designing multimedia in a project-based learning experience. *Journal of Research on Technology in Education*, 42(2), 151-173.
- Hickey, T. & Stenson, N. (2011). Irish orthography: What do teachers and learners need to know about it, and why?. *Language, Culture and Curriculum*, 24:1, 23-46.
- Higgins, S., Xiao, Z. & Katsipataki, M. (2012). *The impact of digital technology on learning: A summary for the education endowment foundation*. Durham, UK: Education Endowment Foundation and Durham University.
- Hoadley, C. H. M. (2005). Design-based research methods and theory building: A case study of research with SpeakEasy, *Educational Technology*, 42-47.
- Hoadley, C. M. (2004). Fostering productive collaboration offline and online: Learning from each other. *Internet Environments for Science Education*, 145-174.
- Hoadley, C. M., 2004. Methodological alignment in design-based research, *Educational Psychologist*, 39(4), 203-212.
- Hoban, G. & Nielsen, W. (2010). The 5 Rs: A new teaching approach to encourage Slowmations (student-generated animations) of science concepts, *Teaching Science*, 56(3), 33-38.
- Hoban, G., Ferry, B., Konza, D. & Vialle, W. (2007). Slowmation: Exploring a new teaching approach in primary school classrooms. In J. Kiggins, L. K. Kervin & J. Mantei (Eds.), *Quality in Teacher Education: Considering different perspectives and agendas*. In *Proceedings of the 2007 Australian Teacher Education Association National Conference Wollongong: Australian Teacher Education Association*, 207-217.
- Höffler, T. N. & Leutner, D. (2007). Instructional animation versus static pictures: A meta-analysis. *Learning and Instruction*, 17, 722-738.
- Howard, S. K. (2013). Risk-aversion: Understanding teachers' resistance to technology integration. *Technology, Pedagogy and Education*, 22(3), 357-372.
- Hubscher-Younger, T. & Narayanan, N.H. (2003). Authority and convergence in collaborative learning. *Computers and Education*, 41(4), 313-334.
- Hughes, J. & Robertson, L. (2010). Transforming practice: Using digital video to engage students. *Contemporary Issues in Technology and Teacher Education*, 10(1), 20-37.
- Irish National Teachers' Organisation (INTO) (2004). *Language in the primary school: An INTO discussion document*. Dublin: Government Publications.
- Irish National Teachers' Organisation (INTO) (2009). *Creativity and the arts in the primary*

- school: Discussion document and proceedings of the consultative conference on education.* Dublin: Government Publications.
- Irish National Teachers' Organisation (INTO) (2011). *Literacy in a changing world: Discussion document and proceedings of the consultative conference on education 2011.* Dublin: Government Publications.
- Jackson, E. (2013). Choosing a methodology: Philosophical underpinning. *Practitioner Research in Higher Education Journal*, 7(1), 49-62.
- Jesse, D. M. (2001). *Educators' guide to collecting and using data: Conducting classroom observations.* Denver, Colorado: RMC Research Corporation.
- Jewitt, C. (2012). *An introduction to using video for research.* Institute of Education, London.
- Jick, T. D. (1979). Mixing qualitative and quantitative methods: Triangulation in action. *Administrative Science Quarterly*, 24, 602-611.
- Johnson, L., Adams Becker, S., Estrada, V., Freeman, A., Kamylyis, P., Vuorikari, R., & Punie, Y. (2014). *Horizon Report Europe: 2014 Schools Edition.* Luxembourg: Publications Office of the European Union, and Austin, Texas: The New Media Consortium.
- Johnson, R. B. & Onwuegbuzie, A. J. (2004). Mixed methods research: A research paradigm whose time has come. *Educational Researcher*, 33(7), 14-26.
- Jones, L. & Somekh, B. (2005). Observation. In B. Somekh, B. & C. Lewin (Eds) *Research Methods in the Social Sciences.* London: Sage.
- Joseph, D. (2004). The practice of design-based research: Uncovering the interplay between design, research, and the real-world context. *Educational Psychologist*, 39(4), 235-242.
- Kafai, Y. B. (1996a). Electronic play worlds: Gender differences in children's construction of video games. In Y. B. Kafai & M. Resnick (Eds). *Constructionism in practice: Designing, thinking, and learning in a digital world.* New Jersey: Lawrence Erlbaum Associates.
- Kafai, Y. B. (1996b). Learning design by making games: Children's development of design strategies in the creation of a complex computational artifact. In Y. B. Kafai & M. Resnick (Eds.) *Constructionism in practice: Designing, thinking, and learning in a digital world.* New Jersey: Lawrence Erlbaum Associates.
- Kafai, Y. B. (2006). Constructionism. In R. K. Sawyer (Ed.) *The Cambridge Handbook of the Learning Sciences.* New York: Cambridge University Press.
- Kafai, Y. B. & Resnick, M. (1996). *Constructionism in practice: Designing, thinking, and learning in a digital world.* New Jersey: Lawrence Erlbaum Associates.
- Kali, Y. (2008). The design principles database as a means for promoting design-based research. *Handbook of design research methods in education: Innovations in science, technology, engineering, and mathematics learning and teaching*, 423-238.
- Kaptelinin, V. (1999). Learning together: Educational benefits and prospects for computer support. *Journal of the Learning Sciences*, 8(3-4), 499-508.
- Kay, A. C. (1972). A personal computer for children of all ages. *Proceedings of the ACM National Conference, Boston.*
- Kelly, A. (2004). Design research in education: Yes, but is it methodological?. *The Journal of the Learning Sciences*, 13(1), 115-128.
- Kennedy, G. (1991). Computers in language teaching. In D. Little & B. Ó Meadhra (Eds), *Media Technologies and Language Learning.* Conference proceedings of an IRAAL (Irish Association for Applied Linguistics) Seminar. Dublin, Ireland.
- Kim, S. I., Yoon, M., Whang, S. M., Tversky, B. & Morrison, J. B. (2007). The effect of animation on comprehension and interest. *Journal of Computer Assisted Learning*, 23(3), 260-270.
- Knobel, M. & Lankshear, C. (2006). *New literacies: Everyday practices and classroom learning.* Open University Press.

- Knowlton, D. S. (2007). I design; therefore I research: Revealing DBR through personal narrative. *Educational Technology and Society*, 10(4), 209-223.
- Koehler, M. J. & Mishra, P. (2005). Teachers learning technology by design. *Journal of Computing in Teacher Education*, 21(3), 94-102.
- Koehler, M. J. & Mishra, P. (2009). What is technological pedagogical content knowledge. *Contemporary Issues in Technology and Teacher Education*, 9(1), 60-70.
- Koehler, M. J., Mishra, P., Bouck, E. C., DeSchryver, M., Kereluik, K., Shin, T. S. & Wolf, L. G. (2011). Deep-play: Developing TPACK for 21st century teachers. *International Journal of Learning Technology*, 6(2), 146-163.
- Koschmann, T. (1999). Computer support for collaboration and learning. *Journal of the Learning Sciences*, 8(3-4), 495-497.
- Koschmann, T., Stahl, G. & Zemel, A. (2007). The video analyst's manifesto (or the implications of Garfinkel's policies for studying instructional practice in design-based research). In R. Goldman, R. Pea, B. Barron & S. J. Derry (Eds), *Video research in the learning sciences*, New York: Routledge.
- Kotzee, B. (2010). Seven posers in the constructivist classroom. *London Review of Education*, 8, 177-187.
- Kozma, R. B. (2011). *Transforming education: The power of ICT policies*. France: United Nations Educational, Scientific and Cultural Organization (UNESCO).
- Krajcik, J. S. & Blumenfeld, P. C. (2006). Project-based learning. In R. K. Sawyer (Ed.) *The Cambridge Handbook of the Learning Sciences*, New York: Cambridge University Press.
- Kress, G. (2010). The profound shift of digital literacies. In *Digital literacies: A research briefing by the Technology Enhanced Learning Phase of the TLRP-TEL* (Teaching and Learning Research Programme. Technology Enhanced Learning Programme), 6-7.
- Langemeyer, I. & Nissen, M. (2005). Activity theory. In B. Somekh & C. Lewin (2005). *Research Methods in the Social Sciences*. London: Sage.
- Langer, J. A. & Applebee, A. N. (1986). Reading and writing instruction: Toward a theory of teaching and learning. *Review of Research in Education*, 13, 171-194.
- Lemke, J. (2007). Video epistemology in- and outside the box: Traversing attentional spaces. In R. Goldman, R. Pea, B. Barron & S. J. Derry (Eds), *Video research in the learning sciences*. New York: Routledge.
- Levin, J. A. & Bruce, B.C. (2001). Technology as media: The learner centered perspective. *AERA Symposium: What teachers should know about technology: Perspectives and practices*.
- Lim, C. P., Nonis, D. & Hedberg, J. (2006). Gaming in a 3D multiuser virtual environment: Engaging students in science lessons. *British Journal of Educational Technology*, 37(2), 211-231.
- Little, D. (1991). Media, media technologies, and language learning: Some applied linguistic perspectives. In D. Little & B. Ó Meadhra (Eds) *Media technologies and language learning. Proceedings of an IRAAL (Irish Association for Applied Linguistics) seminar*.
- Littlejohn, A., Beetham, H. & McGill, L. (2012). Learning at the digital frontier: A review of digital literacies in theory and practice. *Journal of Computer Assisted Learning*, 28(6), 547-556.
- Littlewood, W. (2007). Communicative and task-based language teaching in East Asian classrooms. *Language Teaching*, 40(3), 243-249.
- Lobato, J. (2003). How design experiments can inform a rethinking of transfer and vice versa. *Educational Researcher*, 32(1), 17-20.
- Long, B. T. & Hall, T. (2015). R-NEST: Design-based research for technology-enhanced

- reflective practice in initial teacher education. *Australasian Journal of Educational Technology*, 31(5), 572-596.
- Luckin, R., Bligh, B., Manches, A., Ainsworth, S., Crook, C. & Noss, R. (2012). *Decoding learning: The proof, promise and potential of digital education*. London: NESTA.
- Lyster, R. & Saito, K. (2010). Oral feedback in classroom SLA. *Studies in Second Language Acquisition*, 32(2), 265-302.
- Mackenzie, N. & Knipe, S. (2006). Research dilemmas: Paradigms, methods and methodology. *Issues in Educational Research*, 16(2), 193-205.
- Mackey, A. & Gass, S. M. (2010). *Second language research: Methodology and design*. New York: Routledge, Taylor and Francis Group.
- Maloney, J., Resnick, M., Rusk, N., Silverman, B. & Eastmond, E. (2010). The Scratch programming language and environment. *ACM Transactions on Computing Education (TOCE)*, 10(4), 1-15.
- Many, J. E. & Henderson, S. D. (2005). Developing a sense of audience: An examination of one school's instructional contexts. *Reading Horizons*, 45(4), pp. 321-348.
- Markey, M. (2007). Minority language learning in the Irish educational system and its influence on subsequent foreign language learning. Available at: <http://www.reseau-amerique-latine.fr/ceisal-bruxelles/ET-DH/ET-DH-7-MARKEY.pdf> [Accessed: 16 February 2016] *Symposium proceedings: The management of multilingualism: Which future for indigenous minority languages?* ULB.
- Marshall, H. H. (1996). Implications of differentiating and understanding constructivist approaches. *Educational Psychologist*, 31(3-4), 235-240.
- Martin, F. G. (1996). Ideal and real systems: A study of notions of control in undergraduates who design. In Y. B. Kafai & M. Resnick (Eds.), *Constructionism in practice: Designing, thinking, and learning in a digital world*. New Jersey: Lawrence Erlbaum Associates.
- Martinez, S. L. & Stager, G. (2013). *Invent to learn: Making, tinkering, and engineering in the classroom*. California: Constructing Modern Knowledge Press.
- Mascolo, M. F. (2009). Beyond student-centered and teacher-centered pedagogy: Teaching and learning as guided participation. *Pedagogy and the Human Sciences*, 1(1), 3-27.
- Matthews, W. J. (2003). Constructivism in the classroom: Epistemology, history, and empirical evidence. *Teacher Education Quarterly*, 30(3), 51-64.
- Matthews-DeNatale, G. (2008). *Digital storytelling: Tips and resources*. Simmons College, Boston.
- Mattingly, C., Lutkehaus, N. C. & Throop, C. J. (2008). Bruner's search for meaning: A conversation between psychology and anthropology. *Ethos*, 36(1), 1-28.
- Maxwell, G. S. (2001). *Teacher observation in student assessment*. Queensland School Curriculum Council.
- Mayer, R. E. & Moreno, R. (2002). Animation as an aid to multimedia learning. *Educational Psychology Review*, 14(1), 87-99.
- Mayer, R. E. (2005). Introduction to multimedia learning. *The Cambridge handbook of multimedia learning*.
- Mayer, R. E., Hegarty, M., Mayer, S. & Campbell, J. (2005). When static media promote active learning: Annotated illustrations versus narrated animations in multimedia instruction. *Journal of Experimental Psychology: Applied*, 11(4), 256-265.
- McCandliss, D. B., Kalchman, S. & Bryant, S. (2003). Design experiments and laboratory approaches to learning: Steps toward collaborative exchange. *Educational Researcher*, 32(1), 14-16.
- McCombs, B. L. (2000). *Assessing the role of educational technology in the teaching and*

- learning process: A learner-centered perspective*. Available at: <http://eds-courses.ucsd.edu/tep203/fa04/a/articles/mccombs.pdf> [Accessed: 19 February 2016].
- McCoy, S., Smyth, E. & Banks, J. (2012). *The primary classroom: Insights from the Growing up in Ireland study*. Dublin: ESRI and NCCA.
- McKenney, S., Nieveen, N. & Van Den Akker, J. (2006). Design research from a curriculum perspective. In J. Van den Akker, K. Gravemeijer, S. McKenney & N. Nieveen (Eds.), *Educational Design Research*. London: Routledge.
- McKenney, S. & Reeves, T.C. (2012). *Conducting educational design research*. London: Routledge.
- McKenney, S. & Mor, Y. (2015). Supporting teachers in data-informed educational design. *British Journal of Educational Technology*, 46(2), 265-279.
- Mehan, H. (2008). Engaging the sociological imagination: My journey into design research and public sociology. *Anthropology and Education Quarterly*, 39(1), 77-91.
- Mishra, P. & Girod, M. (2006). Designing learning through learning to design. *The High School Journal*, 44-50.
- Mishra, P. & Koehler, M. J. (2006). Technological pedagogical content knowledge: A framework for teacher knowledge. *Teachers College Record*, 108(6), 1017-1054.
- Morgan, D. L. (2014). Pragmatism as a paradigm for social research. *Qualitative Inquiry*, 20(8), 1045-1053.
- Morrison, J. B., Tversky, B. & Betrancourt, M. (2000). Animation: Does it facilitate learning?. In *AAAI Spring Symposium on Smart Graphics*, 53-59.
- Mullen, R. & Wedwick, L. (2008). Avoiding the digital abyss: Getting started in the classroom with YouTube, digital stories, and blogs. *The Clearing House: A Journal of Educational Strategies, Issues and Ideas*, 82(2), 66-69.
- Mumtaz, S. (2000). Factors affecting teachers' use of information and communications technology: A review of the literature. *Journal of Information Technology for Teacher Education*, 9(3), 319-342.
- Myles, J. (2002). Second language writing and research: The writing process and error analysis in student texts. *TESL-EJ*, 6(2), 1-20. Available at: <http://www.tesl-ej.org/wordpress/issues/volume6/ej22/ej22a1/?wscr> [Accessed: 28 February 2017]
- National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research (1979). *The Belmont report: Ethical principles and guidelines for the protection of human subjects of research*.
- National Council for Curriculum and Assessment (NCCA) (1999). *Curaclam na Gaeilge*. Dublin: Government Publications.
- National Council for Curriculum and Assessment (NCCA) (2005). *Primary curriculum review: Phase 1*. Dublin: Government Publications.
- National Council for Curriculum and Assessment (NCCA) (2007). *Assessment in the primary school curriculum: Guidelines for schools*. Dublin: Government Publications.
- National Council for Curriculum and Assessment (NCCA) (2008). *Modern languages in the primary school curriculum: Feasibility and futures*. Dublin: Government Publications.
- National Council for Curriculum and Assessment (NCCA) (2010). *Primary school curriculum: Mapping the developments*. Dublin: Government Publications.
- National Council for Curriculum and Assessment (NCCA) (2013). *Towards a new language curriculum for primary schools: Audit of language objectives in the primary school curriculum (1999) and language goals in aistear (2009)*. Dublin: Government Publications.
- National University of Ireland, Galway (2006). *Draft Policy on Data Retention*. Available

at:

http://www.nuigalway.ie/research/vp_research/documents/ethics_committee_docs/datapolicy.pdf [Accessed: 11 June 2013].

- Nelson, J., Christopher, A. & Mims, C. (2009). Transformation of teaching and learning. *TechTrends*, 53(5), 80-85.
- Neo, M. (2007). Learning with multimedia: Engaging students in constructivist learning. *International Journal of Instructional Media*, 34(2), 149-159.
- Nic Craith, D. (2004). An curaclam Gaeilge. In Irish National Teachers' Organisation (INTO) *Language in the primary school: An INTO discussion document*. Dublin: Government Publications.
- Nic Craith, D. (2010). *Assessment in the primary school*. Irish National Teachers' Organisation (INTO). Dublin: Government Publications.
- Niemi, H., Harju, V., Vivitsou, M., Viitanen, K., Multisilta, J. & Kuokkanen, A. (2014). Digital storytelling for 21st-century skills in virtual learning environments. *Creative Education*, 5, 657-671.
- Nilsson, M. (2010). Developing voice in digital storytelling through creativity, narrative and multimodality. *International Journal of Media, Technology and Life-Long Learning*, 6(2), 148-160.
- Norris, J. M. & Ortega, L. (2000). Effectiveness of L2 instruction: A research synthesis and quantitative meta-analysis. *Language learning*, 50(3), 417-528.
- Noss, R. & Hoyles, C. (2006). Exploring mathematics through construction and collaboration. In R. K. Sawyer (Ed.), *The Cambridge Handbook of the Learning Sciences*, New York: Cambridge University Press.
- Ó Duibhir, P. & Cummins, J. (2012). Towards an integrated language curriculum in early childhood and primary education (3–12 years). *National Council for Curriculum and Assessment*, 16, 1-156.
- Ó Laoire, M. (2004). Language policy and practice in the classroom. In Irish National Teachers' Organisation (INTO) *Language in the primary school: An INTO discussion document*. Dublin: Government Publications.
- Ó Laoire, M. & Harris, J. (2006). *Language and literacy in Irish-medium primary schools: Review of literature*. Dublin: Government Publications.
- Ó Riagáin, P. (1986). *Public and teacher attitudes toward Irish in the schools. A review of recent surveys*. Dublin: Linguistics Institute of Ireland.
- O'Brien, H., L. & Toms, E. G. (2008). What is user engagement? A conceptual framework for defining user engagement with technology. *Journal of the American Society for Information Science and Technology*, 59 (6), 938-955.
- O'Leary, M. (2006). Towards a balanced assessment system for Irish primary and secondary schools. *OIDEAS* 52, 26(2).
- Oakley, B., Felder, R. M., Brent, R. & Elhadj, I. (2004). Turning student groups into effective teams. *Journal of Student Centered Learning*, 2(1), 9-34.
- O'Donnell, A. M. (2004). A commentary on design research. *Educational Psychologist*, 39(4), 255-260.
- Organisation for Economic Co-operation and Development (OECD) (2015). "Ireland", in *Education policy outlook 2015: Making reforms happen*, Paris: OECD Publishing. Available at: <http://dx.doi.org/10.1787/9789264225442-25-en> [Accessed: 16 February 2016].
- Onwuegbuzie, A. J. & Leech, N. L. (2005). On becoming a pragmatic researcher: The importance of combining quantitative and qualitative research methodologies. *International Journal of Social Research Methodology*, 8(5), 375-387.
- Organisation for Economic Co-operation and Development (OECD) (2016). "Ireland", in *Education at a Glance 2016: OECD Indicators*, Paris: OECD Publishing. Available at: [10.1787/eag-2016-en](http://dx.doi.org/10.1787/eag-2016-en) [Accessed: 16 February 2016]

- Ormel, B. J., Roblin, N. N. P., McKenney, S. E., Voogt, J. M. & Pieters, J. M. (2012). Research-practice interactions as reported in recent design studies: Still promising, still hazy. *Educational Technology Research and Development*, 60(6), 967-986.
- Overland, P. (2004). Can communicative methods enhance ancient language acquisition? *Teaching Theology and Religion*, 7(1), 51-57.
- Pahl, K. (2007). Creativity in events and practices: A lens for understanding children's multimodal texts. *Literacy*, 41(2), 86-92.
- Palincsar, A. S. (1986). The role of dialogue in providing scaffolded instruction. *Educational Psychologist*, 21(1 and 2), 73-98.
- Palincsar, A. S. (1998). Keeping the metaphor of scaffolding fresh – A response to C. Addison Stone's "The metaphor of scaffolding: Its utility for the field of learning disabilities". *Journal of Learning Disabilities*, 31 (4), 370-373.
- Palincsar, A. S. & Brown, A. L. (1984). Reciprocal teaching of comprehension-fostering and comprehension-monitoring activities. *Cognition and Instruction*, 1(2), 117-175.
- Palincsar, A. S. & Ladewski, B. G. (2006). Literacy and the learning sciences. In R. K. Sawyer (Ed.) *The Cambridge Handbook of the Learning Sciences*. New York: Cambridge University Press.
- Papert, S. (1993a). *The children's machine: Rethinking school in the age of the computer*, New York, BasicBooks.
- Papert, S. (1993b). *Mindstorms: Children, computers, and powerful ideas*, New York, BasicBooks.
- Parsons, C. & Lyddy, F. (2009). *Learning to read in Irish and English: A comparison of children in Irish-medium, Gaeltacht and English-medium schools in Ireland. Final report to An Chomhairle um Oideachas Gaeltachta and Gaelscolaíochta*. National University of Ireland, Maynooth.
- Parsons, J. & Taylor, L. (2011). Improving student engagement. *Current Issues in Education*, 14(1).
- Pass, S. (2007). When constructivists Jean Piaget and Lev Vygotsky were pedagogical collaborators: A viewpoint from a study of their communications. *Journal of Constructivist Psychology*, 20, 277-282.
- Pea, R. D. (2004). The social and technological dimensions of scaffolding and related theoretical concepts for learning, education, and human activity. *The Journal of the Learning Sciences*, 13(3), 423-451.
- Pea, R. & Lemke, J. (2007). Sharing and reporting video work. In S. J. Derry (Ed) *Guidelines for video research in education: Recommendations from an expert panel*. Available at: <http://drdc.uchicago.edu/what/video-research-guidelines.pdf> [Accessed: 11 November 2015].
- Penuel, W. R. & Frank, K. A. (2016). Modes of inquiry in educational psychology and learning sciences. In L. Corno & E. M. Anderman (Eds), *Research in Handbook of Educational Psychology*.
- Penuel, W. R., Allen, A. R., Coburn, C. E. & Farrell, C. (2015). Conceptualizing research-practice partnerships as Joint work at boundaries. *Journal of Education for Students Placed at Risk (JESPAR)*, 20(1-2), 182-197.
- Penuel, W. R., Fishman, B. J., Haugan Cheng, B. & Sabelli, N. (2011). Organizing research and development at the intersection of learning, implementation, and design. *Educational Researcher*, 40 (7), 331–337.
- Petkov, M. & Rogers, G. E. (2011). Using gaming to motivate today's technology-dependent students. *Journal of STEM Teacher Education*, 48(1), 7-12.
- Philp, J. (2014). Peer interaction and second language learning: What are the possibilities?. *TESOL Conference, Vietnam*.
- Pilke, E. M. (2004). Flow experiences in information technology use. *International Journal Human-Computer Studies*, 61, 347–357.

- Pillar, G. W. (2011). A framework for testing communicative competence. *Journal of English Studies*, 2(1), 24-37.
- Plomp, T. (2007). Educational design research: An introduction. In T. Plomp & N. Nieveen (Eds). *An Introduction to Educational Design Research*. In Proceedings of the seminar conducted at the East China Normal University [Z]. Shanghai: SLO-Netherlands Institute for Curriculum Development.
- Plowman, L. (1999). *Using video for observing interaction in the classroom*. The Scottish Council for Research in Education (SCRE): Edinburgh.
- Prensky, M. (2001). *Digital natives, digital immigrants*. On the Horizon, MCB University Press, 9(5), 1-6.
- Price, S., Rogers, Y., Stanton-Fraser, D. & Smith, H. (2003). A new conceptual framework for CSCL: Supporting diverse forms of reflection through multiple interactions. In *Proceedings of the International Conference on Computer Supported Collaborative Learning 2003*, 513-522.
- Pritchard, K. & Whiting, R., 2012. Autopilot? A reflexive review of the piloting process in qualitative e-research. *Qualitative Research in Organizations and Management: An International Journal*, 7(3), 338-353.
- Pryor, J. & Crossouard, B. (2008). A socio-cultural theorisation of formative assessment. *Oxford Review of Education*, 34(1), 1-20.
- Puentedura, R. R. (2012). Building upon SAMR. Available at: <http://www.hippasus.com/rrpweblog/archives/2012/09/03/BuildingUponSAMR.pdf> [Accessed: 26 September 2016].
- Quintana, C., Reiser, B. J., Davis, E. A., Krajcik, J., Fretz, E., Golan Duncan, R., Kyza, E., Edelson, D. & Soloway, E. (2004). A scaffolding design framework for software to support science inquiry. *The Journal of the Learning Sciences*, 13(3), 337-386.
- Quintana, C., Shin, N., Norris, C. & Soloway, E. (2006). Learner-centered design: reflections on the past and directions for the future. In R. K. Sawyer (Ed.), *The Cambridge Handbook of the Learning Sciences*. New York: Cambridge University Press.
- Reeves, T. C. (2000). Enhancing the worth of instructional technology research through “design experiments” and other development research strategies. *International Perspectives on Instructional Technology Research for the 21st Century*, 1-15.
- Reeves, T. (2006). Design research from a technology perspective. In J. Van den Akker, K. Gravemeijer, S. McKenney & N. Nieveen (Eds.), *Educational Design Research*. London: Routledge.
- Reeves, T.C., Herrington, J. & Oliver, R. (2005). Design research: A socially responsible approach to instructional technology research in higher education. *Journal of Computing in Higher Education*, 16(2), 96-115.
- Reeves, T. C. (2011). Can educational research be both rigorous and relevant?. *Educational Designer*, 1(4), 1-24.
- Reeves, T. C., McKenney, S. & Herrington, J. (2011). Publishing and perishing: The critical importance of educational design research. *Australasian Journal of Educational Technology*, 27(1), 55-65.
- Reinking, D. & Bradley, B. A. (2008). *On formative and design experiments: Approaches to language and literacy research*. Teachers College Press: New York.
- Reinking, D. & Watkins, J. (1996). *A formative experiment investigating the use of multimedia book reviews to increase elementary students' independent reading*. Reading Research Report No. 55. Athens, GA: National Reading Research Center (NRRC), College of Education, University of Georgia.
- Reiser, B. J. (2004). Scaffolding complex learning: The mechanisms of structuring and problematizing student work. *Journal of the Learning Sciences*, 13(3), 273-304.
- Renkl, A. & Atkinson, R. K. (2007). Interactive learning environments: Contemporary issues

- and trends. An introduction to the special issue. *Educational Psychology Review*, 19(3), 235-238.
- Resnick, M. (2002). Rethinking learning in the digital age. In G. Kirkman, P. Cornelius, J. Sachs & K. Schwab (Eds), *The Global Information Technology Report 2001-2002*. New York: Oxford University Press.
- Resnick, M. (2007). All I really need to know (about creative thinking) I learned (by studying how children learn) in kindergarten. In *Proceedings of the 6th ACM SIGCHI Conference on Creativity and Cognition*.
- Resnick, M. (2012). Point of view: Reviving Papert's dream. *Educational Technology*, 52(4), 42-46.
- Resnick, M. (2014). Give P's a chance: Projects, peers, passion, play. In *Proceedings of Constructionism and Creativity Conference*, Vienna, Austria.
- Resnick, M. & Rosenbaum, E. (2013). Designing for tinkerability. *Design, Make, Play: Growing the Next Generation of STEM Innovators*, 163-181.
- Resnick, M., Maloney, J., Monroy-Hernández, A., Rusk, N., Eastmond, E., Brennan, K., Millner, A., Rosenbaum, E., Silver, J., Silverman, B. & Kafai, Y. (2009). Scratch: Programming for all. *Communications of the ACM*, 52(11), pp. 60-67.
- Rialtas na hÉireann (Government of Ireland) (2006). *Ráiteas i leith na Gaeilge 2006/Statement on the Irish language 2006*, Dublin, 1-36.
- Richards, C. (2005). The design of effective ICT-supported learning activities: Exemplary models, changing requirements, and new possibilities. *Language Learning and Technology*, 9(1), 60-79.
- Richards, J. C. (2005). *Communicative language teaching today*. SEAMEO Regional Language Centre. *into Practice*, 47(3), 220-228.
- Robin, B. (2006). The educational uses of digital storytelling. In *Society for Information Technology & Teacher Education International Conference*, 709-716.
- Robin, B. R. (2008). Digital storytelling: A powerful technology tool for the 21st century classroom. *Theory into Practice*, 47(3), pp. 220-228.
- Robinson, A. (2004). The importance of language: The power of story. *Language in the Primary School: An INTO Discussion Document*. Dublin, Ireland.
- Robinson, K. (2011). *Out of our minds: Learning to be creative*. John Wiley and Sons.
- Robson, C. (2011). *Real world research: A resource for users of social research methods in applied settings*.
- Roque, R., Rusk, N. & Resnick, M. (2016). *Supporting diverse and creative collaboration in the Scratch online community*. Mass Collaboration and Education: Springer International Publishing.
- Roschelle, J. & Penuel, W. R. (2006). Co-design of innovations with teachers: Definition and dynamics. In *Proceedings of the 7th International Conference on Learning Sciences*, 606-612.
- Rossiter, M. & Garcia, P. A. (2010). Digital storytelling: A new player on the narrative field. *New Directions for Adult and Continuing Education*, 2010 (126), 37-48.
- Rowell, J. & Pahl, K. (2015). *The Routledge Handbook of Literacy Studies*. Routledge.
- Royal Irish Academy (RIA) (2011). *National languages strategy: Royal Irish Academy National Committee for Modern Language, Literary and Cultural Studies*. Dublin.
- Ruane, M. (1991). Issues in the use of video technology in the language classroom. In D. Little & M. Ó Meadhra (Eds), *Media Technologies and Language Learning*. Conference proceedings of an IRAAL Seminar. Dublin, Ireland.
- Sadik, A. (2008). Digital storytelling: A meaningful technology-integrated approach for engaged student learning. *Educational Technology Research and Development*, 56(4), 487-506.
- Sandholtz, J. H., Ringstaff, C., & Dwyer, D. C. (1994). Student engagement: Views from technology-rich classrooms. *ACOT Research Report No. 12*. Available at:

<http://www.apple.com/nl/images/pdf/acotlibrary/rpt21.pdf> [Accessed on: 21 February 2017].

- Sandoval, W.A. (2004). Developing learning theory by refining conjectures embodied in educational designs. *Educational Psychologist*, 39(4), 213-223.
- Sandoval, W. (2014). Conjecture mapping: An approach to systematic educational design research. *Journal of the Learning Sciences*, 23(1), 18-36.
- Sandoval, W. A. & Bell, P. (2004). Design-based research methods for studying learning in context: Introduction. *Educational Psychologist*, 39(4), 199-201.
- Sasso, B. A. & de Morais, A. (2014). Egocentric speech in the works of Vygotsky and Piaget: Educational implications and representations by teachers. *International Journal of Humanities and Social Science*, 4(8), 133-143.
- Savignon, S. J. (1976). Communicative competence: Theory and classroom practice. *Central States Conference on the Teaching of Foreign Language*, Michigan.
- Savignon, S. J. (1987). Communicative language teaching. *Theory into Practice*, 26(4), 235-242.
- Sawyer, R. K. (2006). Analyzing collaborative discourse. In R. K. Sawyer (Ed.), *The Cambridge Handbook of the Learning Sciences*, New York: Cambridge University Press.
- Sawyer, R. K. (2008). Optimising learning: Implications of learning sciences research. *OECD/CERI International Conference "Learning in the 21st Century: Research, Innovation and Policy"*.
- Scaife, M. & Rogers, Y. (2005). External cognition, innovative technologies, and effective learning. *Cognition, Education and Communication Technology*, 181-202.
- Scardamalia, M. & Bereiter, C. (2006). Knowledge building: Theory, pedagogy, and technology. In R. K. Sawyer (Ed.), *The Cambridge Handbook of the Learning Sciences*, New York: Cambridge University Press.
- Scheiter, K. & Gerjets, P. (2010). Cognitive and socio-motivational aspects in learning with animations: There is more to it than 'do they aid learning or not'. *Instr Sci*, 38(5), 435-40.
- Schreiber, J. B. & Asner-Self, K. (2011). *Educational research: The interrelationship of questions, sampling, design, and analysis*. NJ: Wiley and Sons, Inc.
- Schüklenk, U. (2005). Module one: Introduction to research ethics. *Developing World Bioethics*, 5(1), 1-13.
- Seikkula-Leino, J. (2007). CLIL learning: Achievement levels and affective factors. *Language and Education*, 21(4), 328-341.
- Sharan, S. & Shachar, H. (1988). *Language and learning in the cooperative classroom*. Springer-Verlag New York Inc.
- Sharples, M., McAndrew, P., Weller, M., Ferguson, R., FitzGerald, E., Hirst, T., Mor, Y., Gaved, M. & Whitelock, D. (2012). *Innovating Pedagogy 2012: Open University Innovation Report 1*. Milton Keynes: The Open University.
- Sharples, M., McAndrew, P., Weller, M., Ferguson, R., FitzGerald, E., Hirst, T. & Gaved, M. (2013). *Innovating Pedagogy 2013: Open University Innovation Report 2*. Milton Keynes: The Open University.
- Shavelson, R. J., Phillips, D. C., Towne, L. & Feuer, M. J. (2003). On the science of education design studies. *Educational Researcher*, 32(1), 25-28.
- Shaw, A. (1996). Social constructionism and the inner City: Designing environments for social development and urban renewal. In Y. B. Kafai & M. Resnick (Eds.), *Constructionism in Practice: Designing, Thinking, and Learning in a Digital World*. New Jersey: Lawrence Erlbaum Associates.
- Shayer, M. (2003). Not just Piaget; not just Vygotsky, and certainly not Vygotsky as alternative to Piaget. *Learning and Instruction*, 13, 465-485.
- Sherin, B., Reiser, B. J. & Edelson, D. (2004). Scaffolding analysis: Extending the

- scaffolding metaphor to learning artifacts. *The Journal of the Learning Sciences*, 13(3), 387-421.
- Shiel, G., Cregan, Á., McGough, A. & Archer, P. (2012). *Oral language in early childhood and primary education (3-8 years)*. Dublin: National Council for Curriculum and Assessment.
- Sloane, F. (2006). Normal and design sciences in education: Why both are necessary. In J. Van den Akker, K. Gravemeijer, S. McKenney & N. Nieveen (Eds.) *Educational Design Research*. London: Routledge.
- Sloane, F.C. & Gorard, S. (2003). Exploring modeling aspects of design experiments. *Educational Researcher*, 32(1), 29-31.
- Speaker, K. M., Taylor, D. & Kamen, R. (2004). Storytelling: Enhancing language acquisition in young children. *Education*, 125(1), 3-14.
- Stahl, G. (2012). Ethnomethodologically informed. *International Journal of Computer-Supported Collaborative Learning*, 7(1), 1-10.
- Stahl, G., Koschmann, T. & Suthers, D. D. (2006). Computer-supported collaborative learning. In R. K. Sawyer (Ed.), *The Cambridge Handbook of the Learning Sciences*, New York: Cambridge University Press.
- Stone, A. C. (1998). The metaphor of scaffolding: Its utility for the field of learning disabilities. *Journal of Learning Disabilities*, 31(4), 344-364.
- Sylvester, R. & Greenidge, W. L. (2009). Digital storytelling: Extending the potential for struggling writers. *The Reading Teacher*, 63(4), 284-295.
- Tabak, I. (2004). Reconstructing context: Negotiating the tension between exogenous and endogenous educational design. *Educational Psychologist*, 39(4), 225-233.
- Tabak, I. (2004). Synergy: A complement to emerging patterns of distributed scaffolding. *Journal of the Learning Sciences*, 13(3), 305-335.
- The Design-Based Research Collective (2003). Design-based research: An emerging paradigm for educational inquiry. *Educational Researcher*, 32(1), 5-8.
- The Office of the Data Protection Commissioner (2003). *Data Protection Acts 1988 and 2003: A guide for data controllers*. Available at: <http://www.dataprotection.ie/documents/forms/NewAGuideForDataControllers.pdf> [Accessed: 11 June 2013].
- Thesen, A. & Kira-Soteriou, J. (2011). Using digital storytelling to unlock student potential. *New England Reading Association Journal*, 46(2), 93-100.
- Tondeur, J., De Bruyne, E., Van den Driessche, M., McKenney, S. & Zandvliet, D. (2015). The physical placement of classroom technology and its influences on educational practices. *Cambridge Journal of Education*, 45(4), 537-556.
- Tsou, W., Wang, W. & Tzeng, Y. (2006). Applying a multimedia storytelling website in foreign language learning. *Computers and Education*, 47, 17-28.
- Urrea, C. (2002). Rethinking and redefining the development of teachers as generators of change. *VI Colombian Conference on Educational Technology*, Colombia.
- Van den Akker, J. (2007). Curriculum design research. In T. Plomp & N. Nieveen (Eds), *An introduction to educational design research*. In Proceedings of the Seminar Conducted at the East China Normal University [Z]. Shanghai: SLO-Netherlands Institute for Curriculum Development.
- Van den Akker, J., Gravemeijer, K., McKenney, S. & Nieveen, N. (2006). *Educational Design Research*. London: Routledge.
- Van der Ark, T. & Schneider, C. (2012). *How digital learning contributes to deeper learning*. Available at: <https://www.gettingsmart.com/wp-content/uploads/2012/12/Digital-Learning-Deeper-Learning-Full-White-Paper.pdf> [Accessed online: 11 April 2019].
- Volman, M. (2005). A variety of roles for a new type of teacher educational technology and the teaching profession. *Teaching and Teacher Education*, 21(1), 15-31.
- Vygotsky, L. (1978). *Mind in society: The development of higher mental processes*.

Cambridge, MA: Harvard University Press.

- Wagner, T. (2015). *Creating innovators: The making of young people who will change the world*. New York: Simon and Schuster.
- Walker, D. (2006). Toward productive design studies. In J. Van den Akker, K. Gravemeijer, S. McKenney & N. Nieveen (eds.) *Educational Design Research*. London: Routledge.
- Walsh, T. & Cassidy, P. (2003). *An audit of research on early childhood care and education in Ireland 1990-2006*. Centre for Early Childhood Development and Education.
- Wang, F., Kinzie, M. B., McGuire, P. & Pan, E. (2010). Applying technology to inquiry based learning in early childhood education. *Early Childhood Education Journal*, 37(1), 381–389.
- Webb, N. M. & Mastergeorge, A. M. (2003). The development of students' helping behavior and learning in peer-directed small groups. *Cognition and Instruction*, 21(4), 361-428.
- Webb, N. M., Nemer, K. M. & Ing, M. (2006). Small-group reflections: Parallels between teacher discourse and student behavior in peer-directed groups. *The Journal of the Learning Sciences*, 15(1), 63-119.
- Wegerif, R. (2006). A dialogic understanding of the relationship between CSCL and teaching thinking skills. *International Journal of Computer-Supported Collaborative Learning*, 1(1), 143-157.
- Weiss, R. E., Knowlton, D. S. & Morrison, G. R. (2002). Principles for using animation in computer-based instruction: Theoretical heuristics for effective design. *Computers in Human Behavior*, 18(4), 465-477.
- Wellington, J. (2000). *Educational research: Contemporary issues and practical approaches*. London: Continuum.
- Wells, G. & Arauz, R. M. (2006). Dialogue in the classroom. *The Journal of the Learning Sciences*, 15(3), 379-428.
- Wiles, R., Heath, S., Crow, G. & Charles, V. (2005). Informed consent in social research: A literature review. *ESRC National Centre for Research Methods, NCRM Methods Review Papers*. Available at: <http://eprints.ncrm.ac.uk/85/1/MethodsReviewPaperNCRM-001.pdf> [Accessed: 6 June 2013].
- Wiske, M. S., Sick, M. & Wirsig, S. (2001). New technologies to support teaching for understanding. *International Journal of Educational Research*, 35(5), 483-501.
- Wood, D., Bruner, J. S., & Ross, G. (1976). The role of tutoring in problem solving. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, 17, pp. 89–100.
- Xu, Y., Park, H. & Baek, Y. (2011). A new approach toward digital storytelling: An activity focused on writing self-efficacy in a virtual learning environment. *Educational Technology & Society*, 14(4), 181-191.

Appendices

APPENDIX A: ETHICS DOCUMENTATION

Letter of Introduction to School



A chara,

I trust you are well.

I am writing to you in relation to a PhD study that I am currently undertaking with the School of Education in National University of Ireland, Galway. The title of this study is *Animated Storytelling: An Investigation into the Efficacy of Student-Created Digital Animations in Irish-Language Learning at Primary School Level*. My intention is to evaluate the use of animation and storytelling techniques in the teaching and learning of Irish to promote students' communicative ability in the language.

I wish to request your permission to conduct my research study in your school with your third class students. All of the information collected will be kept in the strictest confidence and will only be used for research purposes. All data will be securely stored on a computer in my office on the university's campus, and only I will have access to them. I would be pleased to present a summary of my results and findings to you upon completion of this study, if you so wish.

Throughout the year, students will be asked to complete short language quizzes and questionnaires and participate in classroom discussions to gather information about their thoughts, views and competency in relation to the Irish language. The teacher will be invited to participate in several interviews, which will be audio recorded. Each Wednesday, students will create short animations using audio and images that they design, or source online, based on curriculum topics. A video camera will be used to record classroom activities during this time. The teacher will be the only person to be recorded during September and October. Students will only be recorded while partaking in group activities during the remainder of the year. Only the teacher, Teacher, and I will view these video recordings as they will help us to assess and improve our teaching approaches. Students will be invited to present their animations to the rest of their class upon completion. You can find more information relating to this study in the enclosed participant information sheet.

There will be minimal disruption to the students' routine, and the themes and content of the curriculum will be covered as part of this research. The expected benefits associated with your participation are the enhancement of teaching and learning approaches for Irish, and the improvement of students' fluency of the Irish language, as well as stimulating their motivation and desire to engage with it.

The University Research Ethics Committee has given approval for this research project and you can contact the Research Ethics Committee Office at this number: 091- 495312. Please contact me should you wish to discuss this matter further.

I look forward to hearing from you.

Letter of Introduction to Parents



Dear parent,

I hope you are well.

I am writing to you in relation to a PhD study that I am currently undertaking with the School of Education in National University of Ireland, Galway. The title of this study is *Animated Storytelling: An Investigation into the Efficacy of Student-Created Digital Animations in Irish-Language Learning at Primary School Level*. My intention is to evaluate the use of animation and storytelling techniques in the teaching and learning of Irish to promote students' communicative ability in Irish.

I would like to invite your child to participate in this research study, which will take place during the school year. Throughout the year, students will be asked to complete short language quizzes and questionnaires and participate in classroom discussions to gather information about their thoughts, views and competency in relation to the Irish language. Students will create short animations as part of their Irish classes each Wednesday. These animations will be based on curriculum topics. A video camera will be used to record classroom activities during this time. The teacher will be the only person to be recorded during September and October. Students will only be recorded while partaking in group activities during the remainder of the year. Only the teacher, Teacher, and I will ever view these video recordings as they will help us to assess and improve our teaching approaches. Students will be invited to present their animations to the rest of their class upon completion. You can find more information relating to this study in the enclosed participant information sheet.

All of the information collected will be kept in the strictest confidence and will only be used for research purposes. All data will be securely stored on a computer on the university's campus, and only I will have access to them. If you feel uncomfortable with your child being video recorded, he/she can still participate in classroom activities and not be recorded. Please indicate this on the enclosed consent form. There will be minimal disruption to your child's routine, and the themes and content of the curriculum will be covered as part of this research. It is hoped that their participation in this study will result in improved fluency of the Irish language. I would be pleased to present a summary of my results and findings to you, if you so wish.

The University Research Ethics Committee has given approval for this research project and you can contact the Research Ethics Committee Office at this number: 091- 495312. Please contact me should you wish to discuss this matter further, or make an appointment with Ms. Doherty as she would be delighted to discuss our plans for this year with you.

I look forward to hearing from you.

Le gach dea-mhéin,

Information Sheet & Consent Form for Principal



Project Name

Animated Storytelling: An Investigation into the Efficacy of Student-Created Digital Animations in Irish-Language Learning at Primary School Level.

Researcher: Rose Ní Dhubhda

Telephone Number:

Email Address:

Sponsor

The University Research Ethics Committee has given approval for this research project. For information on your rights as a research subject, contact the Research Ethics Committee Office at this number: 091- 495312.

Introduction

I wish to invite you to participate in this research study. I will be evaluating the use of digital animation and storytelling techniques in the teaching and learning of Irish to promote students' communicative ability in Irish. This sheet will describe the purpose and nature of the study, and your rights as a participant in the study.

There will be minimal disruption to the students' routine, and the themes and content of the curriculum will be covered as part of this research. The expected benefits associated with your participation include the enhancement of teaching and learning approaches for Irish, and the improvement of students' fluency of the Irish language, as well as stimulating their motivation and desire to engage with it.

Please take whatever time you need to discuss the study with the researcher. The decision to participate or not is yours. If you decide to participate, please sign and date the last line of this form. I will share my findings with you upon request.

Explanation of the Study

There are three phases to this study. All the activities will be completed over one academic year. The latter two phases will be repeated several times until a desirable result has been reached.

Phase One

I plan to administer a short language quiz and questionnaire to the students, and engage them in classroom discussions to gather information about their thoughts, views and competency in relation to the Irish language. The class teacher will participate in an interview, which will be audio recorded.

Phase Two

This phase will involve the students collaboratively creating animations based on curriculum topics such as pastimes and special occasions. This will take place each Wednesday during Irish class. Students will use various software programs; digital media such as audio, video, images that they design or source online; and storyboarding techniques. Animations completed during class time may be used as part of the data. A video camera will be used to record their activities during this time. Upon completion, students will present their animations to the rest of their class.

Phase Three

Students will complete a short language quiz and questionnaire, and participate in classroom discussion in order to gather information about their thoughts, views and competency in relation to the Irish language. The class teacher will participate in an interview, which will be audio recorded.

Confidentiality

All of the information collected will be confidential and will only be used for research purposes. This means that your identity will be anonymous; in other words, no one besides the researcher will know your name. Whenever data from this study are published, your name will not be used. All data will be stored securely on a computer, and only the researcher will have access to them.

Your Participation

Participating in this study is strictly voluntary. That means you do not have to be a part of the study. If at any point you change your mind and no longer wish to participate, you can tell the researcher. You will not be paid for participating in this study. Please contact me if you have any questions about the research.

Please select as appropriate. By selecting YES to the following questions, you consent to voluntarily participating in this study:

I confirm that I understand the purpose of this research study and that I have had sufficient time to consider my decision.

YES NO

I confirm that I was given ample opportunity to raise any concerns and issues regarding this study.

YES NO

I confirm that my participation is voluntary.

YES NO

I understand that I can withdraw from the study at any time and rejoin later.

YES NO

I agree to partake in this study.

YES NO

Researcher's Statement

I have fully explained this study to the participant. I have discussed the activities and have answered all of the questions that the participant asked.

Signature of Researcher: _____ Date: _____

Principal's Consent

I have read the information provided here. All of my questions were answered to my satisfaction. I voluntarily agree to participate in this study.

Your Signature: _____ Date: _____

Sponsor

The University Research Ethics Committee has given approval for this research project. For information on your rights as a research subject, contact the Research Ethics Committee Office at this number: 091- 495312.

Information Sheet & Consent Form for Parents



Project Name

Animated Storytelling: An Investigation into the Efficacy of Student-Created Digital Animations in Irish-Language Learning at Primary School Level.

Researcher: Rose Ní Dhubhda

Telephone Number:

Email Address:

Introduction

I would like to invite you and your child to participate in my research study. I want to see if using animation and storytelling techniques in Irish lessons can help to enhance a student's ability to speak Irish. This sheet will explain the study to you.

Explanation of the Study

Throughout the year, students will be asked to complete short language quizzes and questionnaires and participate in classroom discussions to gather information about their thoughts, views and competency in relation to the Irish language. Each Wednesday, students will work in groups creating animated stories based on curriculum topics such as pastimes and special occasions. Animations completed during class time may be used as part of the data.

A video camera will be used to record classroom activities during this time (during Wednesday's Irish lesson). The teacher will be the only person to be recorded during September and October. Students will only be recorded while partaking in group activities during the remainder of the year. Only their teacher, Teacher, and I will view these video recordings as they will help us to assess and improve our teaching approaches. Upon completion, students will present their animations to the rest of their class. There will be minimal disruption to your child's routine, and the themes and content of the curriculum will be covered as part of this research. It is hoped that their participation in this study will result in improved fluency of the Irish language. I will share my findings with you upon request.

Confidentiality

All of the information collected will be confidential and will only be used for research purposes. Whenever data from this study are published, their name will not be used. All data will be stored securely on my computer, and only I will have access to them. Any video material recorded during this research will be for the sole purpose of analysis by the researcher and teacher, and will not be shared in any way.

Your Child's Participation

Your child's participation in this study is strictly voluntary. They do not have to take part in this study. Should you decide that your child will not take part in this study, it is important to know that they will still participate in classroom activities, but anything they say or do will not be recorded or used as part of my research. If at any time you change your mind and you no longer wish for your child to participate in this study, you can tell the principal, teacher or researcher.

The decision to allow your child to participate in this study is yours. If you decide your child will participate, please sign and date the last line of this form. Please note that your child will

not be paid for participating in this study and that their grades will not be affected by your final decision. Please contact me, or make an appointment to speak with Teacher, if you have any questions about this research.

Please select as appropriate. By selecting YES to the following questions, you consent to voluntarily participating in this study:

I confirm that I understand the purpose of this study and that I have had sufficient time to consider my decision.

YES NO

I confirm that I was given enough time to raise any concerns and issues regarding this study.

YES NO

I confirm that my child's participation is voluntary.

YES NO

I understand that my child can withdraw from the study at any time and rejoin at a later date.

YES NO

I agree that my child can take part in this study.

YES NO

Parent's Consent

I have read the information provided here and I understand the purpose of this study.

I voluntarily agree to allow my child to participate in this study.

Child's Name: _____

Parent's Signature: _____

Date: _____

Sponsor

The University Research Ethics Committee has given approval for this research project. For information on your rights as a research subject, contact the Research Ethics Committee Office at this number: 091- 495312.



INTRODUCTION

I would like to invite you and your class to take part in my project. I will be exploring how animation and storytelling technologies can help you to learn Irish. This sheet will tell you all about my project and what you will be doing. Please take all the time you need to discuss my project with your teacher or with me. Just remember, you always have to try your best in your Irish classes, but you do not have to take part in my project. If you would like to help me with my project, you must sign your name on the last line of this form along with the date. I hope that your Irish will improve during this time and that you will have fun speaking in Irish to your friends! I will come back and tell you all about my project when I finish! All of the information I collect from you will be confidential and will only be used in my project. I promise to keep your classwork safe on my computer.

WHAT YOU HAVE TO DO!

There are three parts to my project and it will take one full school year to complete.

-  You will complete short language quizzes and questionnaires during the year.
-  You will join in some classroom discussions about learning Irish.
-  You will create short animations in your Irish classes each Wednesday using fun applications, and sounds and images that you create yourself, or find online. You will get to share your animations with the rest of your class. Sometimes a video camera will be used to record you as you work.

You do not have to take part in my project. If you decide not to, you will still join in on the same activities, but nothing you say or do will be used as part of my project. Your decision to take part in my project will not affect your grade. You can change your mind at any time and leave my project - just let your teacher or me know!

By selecting 'YES' to the following questions, you agree to take part in this study:

I understand this study is about. YES NO

I had enough time to make my decision. YES NO

I was able to ask questions about this study. YES NO

I want to take part in this study. YES NO

I understand that I can leave this study at any time and join again later.
NO

I agree to take part in this study. YES NO

Researcher's Statement

I have fully explained this study to the student. I have discussed the activities and have answered all of the questions that the student asked.

Signature of Researcher: _____ Date: _____

Student's Assent

I have read the information provided in this form. All of my questions were answered. I am happy to take part in this study.

Your Signature: _____ Date: _____

Sponsor: *The University Research Ethics Committee has given approval for this research project. For information on your rights as a research subject, contact the Research Ethics Committee Office at this number: 091-495312.*

Information Sheet & Consent Form for the Classroom Teacher



Project Name

Animated Storytelling: An Investigation into the Efficacy of Student-Created Digital Animations in Irish-Language Learning at Primary School Level.

Researcher: Rose Ní Dhubhda

Telephone Number:

Email Address:

Please select as appropriate. By selecting YES to the following questions, you consent to voluntarily participating in this study:

I confirm that I understand the purpose of this research study and that I have had sufficient time to consider my decision.

YES NO

I confirm that I was given ample opportunity to raise any concerns and issues regarding this study.

YES NO

I confirm that my participation is voluntary.

YES NO

I understand that I can withdraw from the study at any time and rejoin later.

YES NO

I agree to partake in this study.

YES NO

Researcher's Statement

I have fully explained this study to the participant. I have discussed the activities and have answered all of the questions that the participant asked.

Signature of Researcher: _____

Date: _____

Teacher's Consent

I have read the information provided by the researcher. All of my questions were answered to my satisfaction. I voluntarily agree to participate in this study.

Your Signature: _____

Date: _____

Information Sheet & Consent Form for Fourth-class Teacher



Project Name

Animated Storytelling: An Investigation into the Efficacy of Student-Created Digital Animations in Irish-Language Learning at Primary School Level.

Researcher: Rose Ní Dhubhda

Telephone Number:

Email Address:

Sponsor

The University Research Ethics Committee has given approval for this research project. For information on your rights as a research subject, contact the Research Ethics Committee Office at this number: 091- 495312.

Introduction

I wish to invite you to participate in this research study. I will be evaluating the use of digital animation and storytelling techniques in the teaching and learning of Irish to promote students' communicative ability in Irish. This sheet will describe the purpose and nature of the study, and your rights as a participant in the study.

Please take whatever time you need to discuss the study with the researcher. The decision to participate or not is yours. If you decide to participate, please sign and date the last line of this form. The expected benefits associated with your participation include the enhancement of teaching and learning approaches for Irish, and the improvement of students' fluency of the Irish language, as well as stimulating their motivation and desire to engage with it. I will share my findings with you upon request.

Explanation of the Study

This study forms part of a PhD research study with the National University of Ireland, Galway investigating the use of animation and storytelling techniques in the teaching and learning of Irish in third class at primary school level. The core investigation explores the use of animated storytelling techniques in promoting an active, student-centred, knowledge-construction environment, and whether this type of environment improves students' communicative ability in the Irish language.

Confidentiality

All of the information collected will be confidential and will only be used for research purposes. This means that your identity will be anonymous; in other words, no one besides the researcher will know your name. Whenever data from this study are published, your name will not be used. All data will be stored securely on a computer, and only the researcher will have access to them.

Your Participation

Participating in this study is strictly voluntary. That means you do not have to be a part of the study. If at any point you change your mind and no longer wish to participate, you can tell the researcher. You will not be paid for participating in this study. Please contact me if you have any questions about the research.

Please select as appropriate. By selecting *YES* to the following questions, you consent to voluntarily participating in this study:

I confirm that I understand the purpose of this research study and that I have had sufficient time to consider my decision.

YES NO

I confirm that I was given ample opportunity to raise any concerns and issues regarding this study.

YES NO

I confirm that my participation is voluntary.

YES NO

I understand that I can withdraw from the study at any time and rejoin later.

YES NO

I agree to partake in this study.
NO

YES

Researcher's Statement

I have fully explained this study to the participant. I have discussed the activities and have answered all of the questions that the participant asked.

Signature of Researcher: _____

Date: _____

Teacher's Consent

I have read the information provided here. All of my questions were answered to my satisfaction. I voluntarily agree to participate in this study.

Your Signature: _____

Date: _____

Information Sheet & Consent Form for Sixth-class Teacher



Project Name

Animated Storytelling: An Investigation into the Efficacy of Student-Created Digital Animations in Irish-Language Learning at Primary School Level.

Researcher: Rose Ní Dhubhda

Telephone Number:

Email Address:

Sponsor

The University Research Ethics Committee has given approval for this research project. For information on your rights as a research subject, contact the Research Ethics Committee Office at this number: 091- 495312.

Introduction

I wish to invite you to participate in this research study. I will be evaluating the use of digital animation and storytelling techniques in the teaching and learning of Irish to promote students' communicative ability in Irish. This sheet will describe the purpose and nature of the study, and your rights as a participant in the study.

Please take whatever time you need to discuss the study with the researcher. The decision to participate or not is yours. If you decide to participate, please sign and date the last line of this form. The expected benefits associated with your participation include the enhancement of teaching and learning approaches for Irish, and the improvement of students' fluency of the Irish language, as well as stimulating their motivation and desire to engage with it. I will share my findings with you upon request.

Explanation of the Study

This study forms part of a PhD research study with the National University of Ireland, Galway investigating the use of animation and storytelling techniques in the teaching and learning of Irish in third class at primary school level. The core investigation explores the use of animated storytelling techniques in promoting an active, student-centred, knowledge-construction environment, and whether this type of environment improves students' communicative ability in the Irish language.

Confidentiality

All of the information collected will be confidential and will only be used for research purposes. This means that your identity will be anonymous; in other words, no one besides the researcher will know your name. Whenever data from this study are published, your name will not be used. All data will be stored securely on a computer, and only the researcher will have access to them.

Your Participation

Participating in this study is strictly voluntary. That means you do not have to be a part of the study. If at any point you change your mind and no longer wish to participate, you can tell the researcher. You will not be paid for participating in this study. Please contact me if you have any questions about the research.

Please select as appropriate. By selecting *YES* to the following questions, you consent to voluntarily participating in this study:

I confirm that I understand the purpose of this research study and that I have had sufficient time to consider my decision.

YES NO

I confirm that I was given ample opportunity to raise any concerns and issues regarding this study.

YES NO

I confirm that my participation is voluntary.

YES NO

I understand that I can withdraw from the study at any time and rejoin later.

YES NO

I agree to partake in this study.

YES NO

Researcher's Statement

I have fully explained this study to the participant. I have discussed the activities and have answered all of the questions that the participant asked.

Signature of Researcher: _____

Date: _____

Teacher's Consent

I have read the information provided here. All of my questions were answered to my satisfaction. I voluntarily agree to participate in this study.

Your Signature: _____

Date: _____

Teacher Interview Schedule 1



INTERVIEW SCHEDULE 1

This study forms part of a PhD research study with the National University of Ireland, Galway investigating the use of digital animation and storytelling techniques in the teaching and learning of Irish in primary schools. The core investigation explores the use of animated storytelling techniques in promoting an active, student-centred, knowledge-construction environment, and whether this type of environment improves students' communicative ability in the Irish language.

I would like to take this opportunity to thank you for participating in this study and to emphasise that there are no right or wrong answers to any of the questions below. I am simply seeking your opinion and knowledge to further inform my research. I would also like to state that all information disclosed here will be kept confidential. All notes, transcripts and recordings will be securely stored on my personal computer in my office on NUIG campus. This interview should take about one hour. I would be happy to send you a copy of the transcription for you to verify and amend as necessary. Please do not hesitate to contact me (rose.nidhubhda@nuigalway.ie) if you have any queries regarding this study, or if you would like further information.

QUESTIONS

1. This interview will be audio recorded. Are you comfortable with this?
2. How many years have you been teaching?
3. How many years have you been teaching at this school?
4. Can you give me some examples of how you integrate technologies into your teaching?

5. Do you think technology can enhance language learning?

6. Do you think the use of technology in the classroom caters to different learning styles?

7. Does the use of technology in the classroom encourage a more inclusive learning environment?

8. Does the use of technology in the classroom encourage greater engagement with the curriculum?

9. Does the use of technology in the classroom motivate students to want to learn more?

10. How do you feel about students engaging with Scratch and other animation programs to create animations of what they learn in the Irish language classroom?

11. How do you feel about the current curriculum content for Irish and your current instructional approach?

12. Do you feel that you engage and motivate your students to learn in your Irish classes?

13. What changes, if any, would you most like to make to your Irish classes?

LIST OF PROBE QUESTIONS

- Could you tell me a little more about that?
- Let me stop you here for a moment and go back to what you said earlier to make sure I understood you well.

- Is there anything else you would like to add?
- I have no further questions. Do you have anything more you wish to add, or ask about, before we finish the interview?
- What should I have asked you that I did not think to ask?

Teacher Interview Schedule 2



INTERVIEW SCHEDULE 2

This study forms part of a PhD research study with the National University of Ireland, Galway investigating the use of digital animation and storytelling techniques in the teaching and learning of Irish in primary schools. The core investigation explores the use of animated storytelling techniques in promoting an active, student-centred, knowledge-construction environment, and whether this type of environment improves students' communicative ability in the Irish language.

I would like to take this opportunity to thank you for participating in this study and to emphasise that there are no right or wrong answers to any of the questions below. I am simply seeking your opinion and knowledge to further inform my research. I would also like to state that all information disclosed here will be kept confidential. All notes, transcripts and recordings will be securely stored on my personal computer in my office on NUIG campus. This interview should take about one hour. I would be happy to send you a copy of the transcription for you to verify and amend as necessary. Please do not hesitate to contact me (rose.nidhubhda@nuigalway.ie) if you have any queries regarding this study, or if you would like further information.

QUESTIONS

1. This interview will be audio recorded. Are you comfortable with this?

2. We are four months into our intervention. What are your thoughts so far?

3. How do you assess their progress in Irish during the year?

4. Do you think that our work to date has influenced the students' Christmas test results in Irish?

5. How do the students' test results compare to their test results in September, if at all?

6. How do the students' test results compare to other years, if at all?

7. I have noticed that 80% of animations created by the students have been created outside of the classroom. What's your opinion in relation to this figure?

8. Can you list any strengths and weaknesses of our storyboard activity?

9. Can you list any strengths and weaknesses of using the Little Bird Tales app in class?

10. Can you list any strengths and weaknesses of using the Go Animate app in class?

11. What changes, if any, would you most like to make to our innovative sessions?

12. Can you recount any occasion where you learned something from the students?

Teacher Interview Schedule 3



INTERVIEW SCHEDULE 3

This study forms part of a PhD research study with the National University of Ireland, Galway investigating the use of digital animation and storytelling techniques in the teaching and learning of Irish in primary schools. The core investigation explores the use of animated storytelling techniques in promoting an active, student-centred, knowledge-construction environment, and whether this type of environment improves students' communicative ability

I would like to take this opportunity to thank you for participating in this study and to emphasise that there are no right or wrong answers to any of the questions below. I am simply seeking your opinion and knowledge to further inform my research. I would also like to state that all information disclosed here will be kept confidential. All notes, transcripts and recordings will be securely stored on my personal computer in my office on NUIG campus. This interview should take about one hour. I would be happy to send you a copy of the transcription for you to verify and amend as necessary. Please do not hesitate to contact me (rose.nidhubhda@nuigalway.ie) if you have any queries regarding this study, or if you would like further information.

QUESTIONS

1. This interview will be audio recorded. Are you comfortable with this?

2. We are six months into our intervention. What are your thoughts so far?

3. Do you think that our work to date has influenced the students' learning in Irish, positively or negatively?

4. I've noticed that students have created less in Scratch outside of the classroom compared to Go Animate and Little Bird Tales. What are your thoughts on this?

5. Can you list any strengths and weaknesses of our storyboard activity?

6. How do you feel about using a technology tool to create our storyboards?

7. Can you list any strengths and weaknesses of using Scratch in Irish class?

8. What are your thoughts so far on our use of digital badges?

9. What changes, if any, would you most like to make to our innovative sessions?

10. Can you recount any occasion where you learned something from the students?

LIST OF PROBE QUESTIONS

- Could you tell me a little more about that?
- Let me stop you here for a moment and go back to what you said earlier to make sure I understood you well.
- Is there anything else you would like to add?
- I have no further questions. Do you have anything more you wish to add, or ask about, before we finish the interview?
- What should I have asked you that I did not think to ask?

Teacher Interview Schedule 4



INTERVIEW SCHEDULE 4

This study forms part of a PhD research study with the National University of Ireland, Galway investigating the use of digital animation and storytelling techniques in the teaching and learning of Irish in primary schools. The core investigation explores the use of animated storytelling techniques in promoting an active, student-centred, knowledge-construction environment, and whether this type of environment improves students' communicative ability in the Irish language.

I would like to take this opportunity to thank you for participating in this study and to emphasise that there are no right or wrong answers to any of the questions below. I am simply seeking your opinion and knowledge to further inform my research. I would also like to state that all information disclosed here will be kept confidential. All notes, transcripts and recordings will be securely stored on my personal computer in my office on NUIG campus. This interview should take about one hour. I would be happy to send you a copy of the transcription for you to verify and amend as necessary. Please do not hesitate to contact me (rose.nidhubhda@nuigalway.ie) if you have any queries regarding this study, or if you would like further information.

QUESTIONS

1. This interview will be audio recorded. Are you comfortable with this?

2. What were the standout moments for you?

3. Will you bring our innovative approach into your teaching next year?

4. Did the students have anything else to say about our new way of learning Irish?

LIST OF PROBE QUESTIONS

- Could you tell me a little more about that?
- Let me stop you here for a moment and go back to what you said earlier to make sure I understood you well.
- Is there anything else you would like to add?
- I have no further questions. Do you have anything more you wish to add, or ask about, before we finish the interview?
- What should I have asked you that I did not think to ask?

Teacher Interview Schedule 5



INTERVIEW SCHEDULE 5

This study forms part of a PhD research study with the National University of Ireland, Galway investigating the use of animation and storytelling techniques in the teaching and learning of Irish in senior primary school classes. The core investigation explores the use of animated storytelling techniques in promoting an active, student-centred, knowledge-construction environment, and whether this type of environment improves students' communicative ability in the Irish language.

I would like to take this opportunity to thank you for participating in this study and to emphasise that there are no right or wrong answers to any of the questions below. I am simply seeking your opinion and knowledge to further inform my research. I would also like to state that all information disclosed here will be kept confidential. All notes, transcripts and recordings will be securely stored on my personal computer in my office on NUIG campus. This interview should take about one hour. I would be happy to send you a copy of the transcription for you to verify and amend as necessary.

Please do not hesitate to contact me (rose.nidhubhda@nuigalway.ie) if you have any queries regarding this study or if you would like further information.

QUESTIONS

1. This interview will be audio recorded. Are you comfortable with this?
2. Have you incorporated our innovative approach into your classes this year?
3. Have you incorporated our innovative approach into your Irish classes this year?
4. Do you think students' grasp of the Irish language has improved?

5. Do you think the students' skills in the use of technology have improved?

6. Were there any learning styles in particular that this innovative approach suited best?

7. Did the activities promote a more inclusive learning environment?

8. Did students engage more with the curriculum?

9. Did the activities motivate student learning?

10. What changes, if any, would you most like to make to our innovative sessions?

11. Will you continue to use animation creation as a teaching methodology in your classroom in future years?

12. Will you continue to promote collaborative learning in your classroom?

LIST OF PROBE QUESTIONS

- Could you tell me a little more about that?
- Let me stop you here for a moment and go back to what you said earlier to make sure I understood you well.
- Is there anything else you would like to add?
- I have no further questions. Do you have anything more you wish to add, or ask about, before we finish the interview?
- What should I have asked you that I did not think to ask?

Teacher Interview Schedule 6



INTERVIEW SCHEDULE 6

This study forms part of a PhD research study with the National University of Ireland, Galway investigating the use of animation and storytelling techniques in the teaching and learning of Irish in senior primary school classes. The core investigation explores the use of animated storytelling techniques in promoting an active, student-centred, knowledge-construction environment, and whether this type of environment improves students' communicative ability in the Irish language.

I would like to take this opportunity to thank you for participating in this study and to emphasise that there are no right or wrong answers to any of the questions below. I am simply seeking your opinion and knowledge to further inform my research. I would also like to state that all information disclosed here will be kept confidential. All notes, transcripts and recordings will be securely stored on my personal computer in my office on NUIG campus. This interview should take about one hour. I would be happy to send you a copy of the transcription for you to verify and amend as necessary. Please do not hesitate to contact me (rose.nidhubhda@nuigalway.ie) if you have any queries regarding this study or if you would like further information.

QUESTIONS

1. This interview will be audio recorded. Are you comfortable with this?
2. How many years have you been teaching?
3. How many years have you been teaching at this school?
4. Teacher mentioned that you incorporated animated storytelling into your Irish classes this year. Can you tell me a little more about how you got on?

5. Do you think that it influenced the students' learning in Irish, positively or negatively?

6. What did you think of the storyboard activity?

7. What did you think of the technology activity?

8. Do you think the students' skills in the use of technology have improved?

9. Did students engage more with the curriculum?

10. Did the activities motivate student learning?

11. What changes, if any, would you make to this approach to language learning?

12. Will you continue to use animated storytelling as a teaching methodology in your classroom in future years?

13. Will you continue to promote collaborative learning in your classroom?

14. How do you feel about the current curriculum content for Irish and your current instructional approach?

Primary School Teachers: Rang Gaeilge

General Information

Page description:

2

This study forms part of a PhD study with the National University of Ireland, Galway investigating the use of animation and storytelling techniques in the teaching and learning of Irish at primary school level. The core investigation explores the use of animated storytelling techniques in promoting an active, student-centred, knowledge-construction environment, and whether this type of environment improves students' communicative competence in the Irish language.

If you are a primary school teacher in an English-medium school, I would very much appreciate your help in this. This survey should take no more than 10 minutes to complete.

I would like to take this opportunity to thank you for participating in this study and to emphasise that there are no right or wrong answers to any of the questions below. I am simply seeking your opinion and knowledge to further inform my research. I would also like to reiterate that all information disclosed here will be kept confidential and stored securely.

As an acknowledgement of your time, respondents who have completed this survey in full will be entered into a draw to win a Kindle. Please ensure that you include your name, email address, and school name at the end of this survey if you wish to be included.

Please do not hesitate to contact me (rose.nidhubhda@nuigalway.ie) if you have any queries regarding this study or if you would like further information.

3

1. I understand what this research study entails and I agree to participate. *

I consent to participate in this study

General Computer Use

2. How would you rate your computer skills? *

Very Good

Good

Average

Poor

Comments

ID 7

3. Have you had any previous computer training? *

- In-service Training
- Certificate
- Diploma
- Degree
- Postgraduate Diploma
- Masters Degree
- Self-Taught

Comments

4. Do you have a room in your school that is used exclusively as a computer laboratory? *

Yes

No

Comments

LOGIC Hidden unless: Question "Do you have a room in your school that is used exclusively as a computer laboratory?" #4 is one of the following answers ("Yes")

ID 12

5. How often do your students use the computer laboratory? *

Almost Never

Sometimes

Regularly

Everyday

Not Applicable

Comments

6. How often do your students use the computer laboratory as part of their Irish lessons? *

- Almost Never Sometimes Regularly Everyday Not Applicable
-

Comments

LOGIC Show/hide trigger exists.

ID 15

7. Do you have a computer or a tablet in your classroom? *

- Yes
- No

VALIDATION Must be numeric

LOGIC Hidden unless: Question "Do you have a computer or a tablet in your classroom?" #7 is one of the following answers ("Yes")

ID 95

8. Please state the number of computers/tablets you have in your classroom? *

9. How often do your students use the classroom computer/tablet? *

- Almost Never Sometimes Regularly Everyday Not Applicable
-

Comments

LOGIC Hidden unless: Question "Do you have a computer or a tablet in your classroom?" #7 is one of the following answers ("Yes")

ID 17

10. How often do you use the classroom computer/tablet in your Irish lessons? *

- Almost Never Sometimes Regularly Everyday Not Applicable
-

Comments

11. I like to use technology in my classroom. *

Strongly agree	Agree	Neither Agree nor Disagree	Disagree	Strongly disagree	Not Applicable
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/> Not Applicable

Comments

ID 20

12. I think technologies are useful tools for teaching and learning. *

Strongly agree	Agree	Neither Agree nor Disagree	Disagree	Strongly disagree	Not Applicable
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/> Not Applicable

Comments

13. My students enjoy using technology tools in the classroom. *

Strongly agree	Agree	Neither Agree nor Disagree	Disagree	Strongly disagree	Not Applicable
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/> Not Applicable

Comments

ID 24

14. Some of the positive aspects of using technologies in the classroom include... *

ID 25

15. Some of the negative aspects of using technologies in the classroom include... *

16. Please select the technology tools that you currently use in your classroom: *

- Word Processors like Word or Pages
- Slide Presentation Applications like Prezi or PowerPoint
- Google Forms
- Google Drive
- EverNote
- Word Cloud Applications
- Audio Applications like Audacity or SoundCloud
- Video Editing Applications like Movie Maker or iMovie

- Programming Applications like Scratch
- Animation Applications like PuppetPals or Go Animate
- Twitter/Edmodo
- Quiz software like Quizlet or Socrative
- Classroom Management Applications like ClassDojo
- Blogs like Weebly or WordPress
- Other

Comments

17. How often do you use technology tools in your teaching of Irish? *

Almost Never

Sometimes

Regularly

Everyday

Comments

ID 30

18. Which of the following technology tools/sites do you use in your Irish lessons? (Check all that apply) *

- Cúla Caint Applications
- TG Lurgan
- www.focal.ie
- www.csis.ul.ie/focloir
- http://breis.focloir.ie/ga/
- www.potafocal.ie
- An Litreoir GaelSpell
- An Litreoir Gaeilge Microsoft
- An Gramadóir Ceart

- WinGléacht
- Rory's StoryCubes (app)
- Wordle
- Tagexdo
- ABCya
- Seomra Ranga
- Féasta Focail
- Fios
- Other

Comments

19. Do you use audiovisual material (animations, cartoons, videos) in your Irish classes? If Yes, please list in the comment box below. *

Almost Never



Sometimes



Regularly



Everyday



Comments

32

20. How often do you use audiovisual activities in teaching Irish? *

Seldom (once every two months or less) Very often (more than once a week)

Now and then (once every 2-4 weeks) Other (please specify)

Often (once a week)

Teaching and Learning Approaches in Irish Class

21. How many hours per week do you spend teaching Irish? *

3 hours 3.5 hours 4 hours 4.5 hours 5 hours

Other

Comments

35

22. In a typical week of teaching Irish to your students, what percentage of class time is spent on each of the following activities? Please ensure that responses add up to 100%. *

Teaching and Learning Activities *	0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
Administrative Tasks such as corrections *	0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
Maintaining Discipline *	0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
Comments	

23. Do you provide different teaching and learning experiences in your Irish lessons for students of different ability levels? If Yes, please specify in the comment box below. *

- Yes
- No

Comments

IB 39

24. How often do you offer differentiation in your Irish lessons? *

	Never or Almost Never	In a Few Lessons	In Several Lessons	In Almost All Lessons
I provide struggling students with easier assignments or homework	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I provide advanced students with more difficult assignments or homework	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I give special guidance to struggling students while other students are doing assignments/projects	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I assign homework to students on the basis of their individual needs and abilities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Comments

25. How often do you use the following activities with your students in your Irish lessons? *

	Never or Almost Never	In a Few Lessons	In Several Lessons	In Almost All Lessons
Reading a text so many times with your students that they can recite it	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Reading a text aloud to your students over and over again	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Having your students memorise as many details as possible	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Having your students relate new information to their prior knowledge	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Having your students relate curricular content to their own lives	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Comments

D 56

26. How often do you usually assign Irish homework to your students? *

- Never or Almost Never
 Every Two Weeks
 About Once a Week
 Every or almost every lesson

Comments

27. How often do you use the following to assess your students learning of Irish? *

	Never or Almost Never	In a Few Lessons	In Several Lessons	In Almost All Lessons
Textbook assignments	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Teacher-developed tests or quizzes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Grades (such as A-F)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Written comments	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Individual oral feedback	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Group oral feedback	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Teacher observation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Peer/self evaluation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Comments

28. How often do you use the following approaches for grouping students for instruction within your Irish classes? *

	Never or Almost Never	In a Few Lessons	In Several Lessons	In Almost All Lessons
Whole class teaching (all students are taught the same thing at the same time)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ability grouping (the most proficient students are in one group; the weaker students in another)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Mixed-ability grouping (students are organised into groups of varying abilities)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Interest grouping (students are grouped according to their own interests or preferences)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Individualised instruction (students work individually on assignments tailored to their needs)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Paired instruction (students work in pairs on specific assignments)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Comments

29. The communicative approach is promoted in the Irish language classroom. Do you encourage communicative language learning in Irish class? If Yes, please specify in the comment box below. *

- Yes
- No
- Sometimes

Comments

78

30. Do you encourage active learning in Irish class? If Yes, please specify in the comment box below. *

- Yes
- No
- Sometimes

Comments

31. Do you encourage collaborative group work in Irish class? If Yes, please specify in the comment box below. *

- Yes
- No
- Sometimes

Comments

80
32. Do you encourage students to think and reflect about their own learning in Irish class? If Yes, please specify in the comment box below. *

- Yes
- No
- Sometimes

Comments

33. Which textbooks and course materials are most useful? Why? *

ID 82

34. Would you feel comfortable using animations in your teaching of Irish. Please use the comment box below to expand on this! *

- Yes
 No

Comments

ID 83

35. Would you feel comfortable facilitating students in the creation of their own animations in Irish class? Please use the comment box below to expand on this! *

- Yes
 No

Comments

36. Would you feel comfortable facilitating students in the creation of their own animations in Irish class using Scratch (a programming language for children)? Please use the comment box below to expand on this! *

- Yes
 No

Comments

ID 93

37. Please feel free to leave any additional comments here!

Thank you for your time and cooperation.

Táim thar a bheith buíoch díot as do chuid ama agus do chuid eolais.

Please include your name, email address, and your school's name if you would like to be entered into a draw for a Kindle.

Le gach dea-mhéin,
Rose Ní Dhubhda

ID 88

38. What is your name?

VALIDATION %s format expected

ID 87

39. What is your email address?

38. What is your name?

VALIDATION %s format expected

ID 87

39. What is your email address?

ID 89

40. What is your gender?

- Female
- Male

41. Which category below includes your age?

18-24	<input type="checkbox"/>
25-34	<input type="checkbox"/>
35-54	<input type="checkbox"/>
55+	<input type="checkbox"/>

ID 92

42. What is the name of your school?

ID 91

43. In what county is your school?

Go Raibh Maith Agat!

Student Questionnaire 1

Name: _____

Date: _____

Quiz name: Student Questionnaire 1

1. What languages are you fluent in?

- (A) French
 - (B) English
 - (C) Irish
 - (D) German
 - (E) Spanish
-

2. What languages do you mainly speak at home?

- (A) Irish
 - (B) English
 - (C) Spanish
 - (D) French
 - (E) German
-

3. What is your favourite language?

- (A) Spanish
 - (B) English
 - (C) Irish
 - (D) German
 - (E) French
-

4. How do you rate your ability to speak Irish?

- (A) Excellent
- (B) Good
- (C) Poor

5. How do you rate your ability to write in Irish?

- (A) Excellent
 - (B) Good
 - (C) Poor
-

6. How do you rate your ability to read in Irish?

- (A) Excellent
 - (B) Good
 - (C) Poor
-

7. How do you rate your ability to understand someone speaking Irish?

- (A) Excellent
- (B) Good
- (C) Poor

8. Which of these activities is your favourite activity to do in Irish?

- (A) To read in Irish
 - (B) To write in Irish
 - (C) To speak in Irish
 - (D) To listen to Irish
-

9. Which of these activities is your least favourite activity to do in Irish?

- (A) To read in Irish
- (B) To write in Irish
- (C) To speak in Irish
- (D) To listen to Irish

10. How do you rate your computer skills?

- (A) Excellent
 - (B) Good
 - (C) Poor
-

11. I like to use mobile apps.

- (A) Yes
 - (B) No
 - (C) Sometimes
-

12. I like to explore websites.

- (A) Yes
- (B) No
- (C) Sometimes

13. Do you like working on activities on your own?

- (A) Yes
 - (B) No
 - (C) Sometimes
-

14. Do you like working on activities in pairs?

- (A) Yes
- (B) No
- (C) Sometimes

15. Do you like working on activities as part of a group?

- (A) Yes
 - (B) No
 - (C) Sometimes
-

16. What way do you most prefer to work on activities in class?

- (A) On Your Own
 - (B) In Pairs
 - (C) In Groups
-

17. What way do you least prefer to work on activities in class?

- (A) On Your Own
- (B) In Pairs
- (C) In Groups

18. Do you enjoy learning Irish?

- (A) Yes
 - (B) No
 - (C) Sometimes
-

19. Do you find it hard to concentrate on Irish activities in class?

- (A) Yes
- (B) No
- (C) Sometimes

20. Do you look forward to your Irish classes?

- (A) Yes
 - (B) No
 - (C) Sometimes
-

21. Do you think about activities after you have finished them?

- (A) Yes
 - (B) No
 - (C) Sometimes
-

22. What do you like doing in Irish class?

Student Questionnaire 2

Name: _____

Date: _____

Quiz name: Student Questionnaire 2

1. How do you rate your ability to speak Irish?

- A Excellent
 - B Good
 - C Poor
-

2. How do you rate your ability to write in Irish?

- A Excellent
 - B Good
 - C Poor
-

3. How do you rate your ability to read in Irish?

- A Excellent
 - B Good
 - C Poor
-

4. How do you rate your ability to understand someone speaking Irish?

- A Excellent
- B Good
- C Poor

5. Which of these activities is your favourite activity to do in Irish?

- A To read in Irish
 - B To write in Irish
 - C To speak in Irish
 - D To listen to Irish
-

6. Which of these activities is your least favourite activity to do in Irish?

- A To read in Irish
 - B To write in Irish
 - C To speak in Irish
 - D To listen to Irish
-

7. My grammar has improved.

- A Yes
 - B A little
 - C No
-

8. My vocabulary has improved.

- A Yes
- B A little

Page 1 of 4

- C No

-
9. My spelling has improved.
- A Yes
 - B A little
 - C No
-
10. My pronunciation has improved.
- A Yes
 - B A little
 - C No
-
11. My Irish lessons on Wednesdays are interesting!
- A Yes
 - B Kind of
 - C No
-
12. My Irish lessons on Wednesdays are fun!
- A Yes
 - B Kind of
 - C No
-
13. My Irish lessons on Wednesdays have helped me improve my Irish.
- A Yes
 - B Kind of
 - C No
-
14. My Irish lessons on Wednesdays have helped me learn more about technology.
- A Yes
 - B Kind of
 - C No
-
15. I would like to do more Irish lessons like those on Wednesdays.
- A Yes
 - B Kind of
 - C No
-
16. Did you like working on class activities on your own?
- A Yes
 - B Sometimes
 - C No
-
17. Did you like working on class activities in pairs?
- A Yes
 - B Sometimes
 - C No

18. Did you like working on class activities as part of a group?
- A Yes
 - B Sometimes
 - C No
-
19. What way do you most prefer to work on activities in class?
- A On my own
 - B In Pairs
 - C In Groups
-
20. What way do you least prefer to work on activities in class?
- A On my own
 - B In Pairs
 - C In Groups
-
21. Did you learn from other students while working on class activities on Wednesdays?
- A Yes
 - B Sometimes
 - C No
-
22. Did you teach other students while working on class activities on Wednesdays?
- A Yes
 - B Sometimes
 - C No
-
23. Did you enjoy solving problems while working on class activities on Wednesdays?
- A Yes
 - B Sometimes
 - C No
-
24. Did you think about class activities after you completed them on Wednesdays?
- A Yes
 - B Sometimes
 - C No
-
25. Did you find it difficult to concentrate on any of the activities on Wednesdays?
- A Yes
 - B Sometimes
 - C No
-
26. Did you enjoy sharing your animations with the rest of your class on presentation day?
- A Yes
 - B Sometimes
 - C No
-

27. Would you like to continue learning Irish in this way?

- A Yes
 - B No
-

28. Would you like to learn another language in this way?

- A Yes
 - B No
-

29. Do you look forward to your Irish classes?

- A Yes
 - B Yes (on Wednesdays only)
 - C No
-

30. What do you like doing in Irish class on Wednesdays?

Parent Questionnaire



I understand what this research study entails and I agree to participate and I consent to participate in this study:

Do you feel there has been a change in your child's attitude to Irish?

Positive

Negative

No Change

Has your child shown more interest than usual in Irish?

Yes

No

Does your child speak more Irish than usual at home?

Yes

No

Does your child enjoy creating animations at home?

Yes

No

Please leave any additional comments you may have in the textbox below:

Grandparent Questionnaire



I understand what this research study entails and I agree to participate and I consent to participate in this study:

Do you feel there has been a change in your grandchild's attitude to Irish?

Positive

Negative

No Change

Has your grandchild shown more interest than usual in Irish?

Yes

No

Does your grandchild speak more Irish than usual at home?

Yes

No

Does your grandchild enjoy creating animations at home?

Yes

No

Please leave any additional comments you may have in the textbox below:

Fourth-Class Student Questionnaire

1. Do you think learning Irish is boring?

A Yes

B No

2. Did you find learning Irish through creating stories and animations a better way to learn Irish?

3. How would you change the way you learn Irish in school?

4. If you could give teachers tips for teaching Irish...what would they be?

5. If you could give other students tips for learning Irish...what would they be?

Fourth-Class Teacher Questionnaire



Follow-up Questionnaire for Third Class (now Fourth Class)

1. How many years have you been teaching?

2. How many years have you been teaching fourth class?

3. Did you have a fourth-class group last academic year?

Yes

No

4. Do you feel your current fourth-class students' attitude to Irish is more positive compared to that of previous cohorts of fourth-class students?

Yes

No

Comments

5. Have your current fourth-class students shown more interest than usual in Irish?

Yes

No

Comments

6. Would you say that your current fourth-class students are more confident than usual when it comes to speaking Irish?

Yes

No

Comments

7. Would you say that your current fourth-class students are more confident than usual when it comes to writing Irish?

Yes

No

Comments

8. Would you say that your current fourth-class students are more forthcoming than usual when it comes to answering questions in Irish?

Yes

No

Comments

9. Would you say that your current fourth-class students are more motivated than usual to participate in their Irish lessons?

Yes

No

Comments

10. Would you say that your current fourth-class students have a higher competency in Irish compared to previous cohorts of fourth-class students?

In General

Yes

No

Specifically

READING

Yes

No

WRITING

Yes

No

SPEAKING

Yes

No

LISTENING

Yes

No

GRAMMAR

Yes

No

FLUENCY

Yes

No

PRONUNCIATION

Yes

No

Please leave any additional comments/observations you may have in the textbox below:

Student Feedback Session Questions

Session One:

Cad é an rud is fearr leat a dhéanamh sa rang Gaeilge? What's your favourite thing to do in Irish class?

Session Two:

Do you like hearing your own voices? An maith leat bheith ag éisteacht le do ghuth féin?

Do you like writing your own stories? An maith leat do scéalta féin a scríobh?

Is there anything special that you would like to do in Irish class? An bhfuil aon rud ar leith ar mhaith leat a dhéanamh sa rang Gaeilge?

Session Three:

Do you prefer to work on your stories on your own or with a friend? What do you like? What didn't you like? An maith leat do scéalta a scríobh leat féin nó le do chairde? Cad is maith leat? Cad nach maith leat?

Is it getting easier to write your stories? An bhfuil sé ag fáil níos éasca do scéalta a scríobh?

Give me one word that describes how you feel about these lessons?

Session Four:

Give me one word to describe how you feel about making stories in Go Animate?

Session Five:

Quiz name: **January Feedback**

1. How much time do you spend on your animations outside of school?

- A 1 hour a week
- B 2 hours a week
- C 3 hours a week
- D 4 hours a week
- E 5 hours a week
- F 6 hours a week



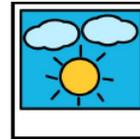
2. Do you think creating storyboards and animations in class are good for helping you to use your Irish?

- A True
- B False



3. Which application do you prefer – Little Bird Tales or Go Animate?

- A Go Animate
- B Little Bird Tales



4. Would you like to try out a new application or spend more time on Go Animate?

- A Spend more time on Go Animate
- B Try out a new application



5. I like working in groups!

- A True
- B False



Session Six:

Cad a cheapann tú faoi Scratch? [What do you think of Scratch?]

Session Seven:

An maith leat Scratch? [Do you like Scratch?]

An maith leat obairghrúpa a dhéanamh [Do you like doing group work?]

Session Eight:

Quiz name: April Feedback

1. How much time do you spend on Scratch outside of school?

- A 1 hour a week
- B 2 hours a week
- C 3 hours a week
- D 4 hours a week
- E 5 hours a week
- F 6 hours a week
- G More than 6 hours a week



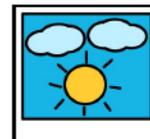
2. Do you think creating storyboards and Scratch animations in class are good for helping you to use your Irish?

- A True
- B False



3. Which application do you prefer – Little Bird Tales or Go Animate?

- A Go Animate
- B Little Bird Tales



4. Which application do you prefer – Go Animate or Scratch?

- (A) Go Animate
- (B) Scratch



5. Which is your favourite application of all three listed below?

- (A) Little Bird Tales
- (B) Go Animate
- (C) Scratch



Page 1 of 2

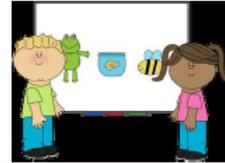
6. I like working in groups!

- (A) True
- (B) False



7. I like working in pairs.

- (A) True
- (B) False



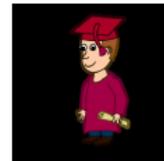
8. I like working on my own.

- (A) True
- (B) False



9. Which is your favourite way to work in class?

- (A) In Groups
- (B) On My Own
- (C) In Pairs



Digital Badge Questionnaire 1

Quiz name: Copy of Rewards Survey

1. I like getting rewards in class.

- A True
 B False
-

What kind of rewards do you like getting in class? You can list as many as you want. For example: stickers, stampers, a note from teacher for home, dojo points, computer pass, homework pass, work put on the wall, work put up on twitter, words of praise from teacher, getting an award or a mention at assembly, written note from teacher, getting jobs to do in class, or any others you can think of.

2.

If you had to pick one reward as your favourite...what would it be? Only one please! For example: stickers, stampers, a note from teacher for home, dojo points, computer pass, homework pass, work put on the wall, work put up on twitter, words of praise from teacher, getting an award or a mention at assembly, written note from teacher, getting jobs to do in class, or any others you can think of.

3.

What rewards do you not like so much (if any)? For example: stickers, stampers, a note from teacher for home, dojo points, computer pass, homework pass, work put on the wall, work put up on twitter, words of praise from teacher, getting an award or a mention at assembly, written note from teacher, getting jobs to do in class, or any others you can think of.

4.

5. Outside of school is there any rewards that you like to get? For example, praise from a coach or leader, medals, trophies, badges, belts, promotion to a higher level or any other suggestions.

Page 1 of 2

6. Getting rewards makes me work harder.

- A True
 B False
-

7. Teacher telling me I may earn a reward makes me concentrate more / work harder.

- A Always
- B Most of the time.
- C Sometimes
- D Rarely
- E Never

8. Finish the sentence: Rewards are...

Digital Badge Questionnaire 2

Quiz name: [Copy of Irish Rewards Survey](#)

1. I like speaking in Irish.

- A Very much.
 - B A little bit.
 - C Not really.
 - D Not at all.
-

2. Speaking in Irish is tricky.

- A Agree
 - B Not sure
 - C Disagree
-

3. I would like to try to speak Irish a little more often.

- A Agree
 - B Not sure
 - C Disagree
-

4. I would like a reward system that would encourage me to try to speak more Irish

- A Agree
 - B Not sure
 - C Disagree
-

5. Could you suggest a reward system that would be good for encouraging students to speak Irish a bit more.

Table 11.1: Data Collection Summary

	Date	Instrument	Summary	Duration	Word Count
1	03/09/2014	Observation Session 1	Video Recording	01:05:24	2001
2	10/09/2014	Observation Session 2	Video Recording	00:39:19	1008
3	17/09/2014	Observation Session 3	Video Recording	01:00:56	1625
4	24/09/2014	Observation Session 4	Video Recording	01:07:13	2310
5	01/10/2014	Observation Session 5	Video Recording	01:00:28	1217
6	08/10/2014	Observation Session 6	Video Recording	01:06:03	1226
7	15/10/2014	Observation Session 7	Video Recording	01:01:30	1231
8	15/10/2014	Observation Session 7	Video Recording	01:09:52	1565
9	15/10/2014	Observation Session 7	Fieldnotes		1084
10	22/10/2014	Observation Session 8	Video Recording	01:40:31	3098
11	22/10/2014	Observation Session 8	Fieldnotes		1030
12	23/10/2014	Observation Session 9	Video Recording	01:41:01	2664
13	23/10/2014	Observation Session 9	Fieldnotes		1776
14	12/11/2014	Observation Session 10	Video Recording	01:09:06	4344
15	12/11/2014	Observation Session 10	Audio Recording	00:21:34	1476
16	12/11/2014	Observation Session 10	Fieldnotes		1020
17	19/11/2014	Observation Session 11	Video Recording	01:03:53	6064
18	19/11/2014	Observation Session 11	Fieldnotes		150
19	26/11/2014	Observation Session 12	Video Recording	00:58:02	1836
20	26/11/2014	Observation Session 12	Audio Recording	00:45:59	3836
21	26/11/2014	Observation Session 12	Fieldnotes		666

22	03/12/2014	Observation Session 13	Video Recording	01:23:58	4940
23	03/12/2014	Observation Session 13	Audio Recording	00:18:24	1640
24	03/12/2014	Observation Session 13	Fieldnotes		416
25	03/12/2014	Observation Session 13	Video Recording	00:58:19	1687
26	03/12/2014	Observation Session 13	Fieldnotes		452
27	04/12/2014	Observation Session 14	Video Recording	01:33:02	
28	04/12/2014	Observation Session 14	Audio Recording	00:43:29	4258
29	04/12/2014	Observation Session 14	Fieldnotes		476
30	10/12/2014	Observation Session 15	Video Recording	01:08:43	3402
31	10/12/2014	Observation Session 15	Audio Recording	00:25:49	2447
32	10/12/2014	Observation Session 15	Fieldnotes		1006
33	17/12/2014	Observation Session 16	Video Recording	00:32:30	947
34	17/12/2014	Observation Session 16	Audio Recording	00:33:50	3388
35	17/12/2014	Observation Session 16	Fieldnotes		466
36	21/01/2015	Observation Session 17	Video Recording	01:00:35	2617
37	21/01/2015	Observation Session 17	Audio Recording	00:41:04	4559
38	21/01/2015	Observation Session 17	Fieldnotes		396
39	22/01/2015	Observation Session 18	Video Recording	01:12:26	1850
40	22/01/2015	Observation Session 18	Audio Recording	00:39:18	3523
41	04/02/2015	Observation Session 19	Video Recording	01:01:21	3811
42	04/02/2015	Observation Session 19	Audio Recording	00:45:33	5961
43	04/02/2015	Observation Session 19	Fieldnotes		652
44	05/02/2015	Observation Session 20	Video Recording	01:37:52	5954

45	05/02/2015	Observation Session 20	Audio Recording	01:21:01	10068
46	05/02/2015	Observation Session 20	Fieldnotes		285
47	11/02/2015	Observation Session 21	Video Recording	01:01:27	3683
48	11/02/2015	Observation Session 21	Audio Recording	00:37:59	5126
49	11/02/2015	Observation Session 21	Fieldnotes		1240
50	18/02/2015	Observation Session 22	Video Recording	01:01:27	3480
51	18/02/2015	Observation Session 22	Audio Recording	00:37:59	4121
52	18/02/2015	Observation Session 22	Fieldnotes		1240
53	25/02/2015	Observation Session 23	Video Recording	01:42:45	6840
54	25/02/2015	Observation Session 23	Audio Recording	00:37:39	6291
55	25/02/2015	Observation Session 23	Fieldnotes		107
56	11/03/2015	Observation Session 24	Video Recording	01:08:57	4957
57	11/03/2015	Observation Session 24	Audio Recording	00:32:44	4536
58	11/03/2015	Observation Session 24	Fieldnotes		389
59	18/03/2015	Observation Session 25	Video Recording	01:07:57	3451
60	18/03/2015	Observation Session 25	Audio Recording	00:37:35	4629
61	25/03/2015	Observation Session 26	Video Recording	01:03:32	3871
62	25/03/2015	Observation Session 26	Audio Recording	00:45:58	2636
63	25/03/2015	Observation Session 26	Fieldnotes		230
64	26/03/2015	Observation Session 27	Video Recording	01:20:23	2758
65	26/03/2015	Observation Session 27	Audio Recording	01:15:23	4208
66	15/04/2015	Observation Session 28	Video Recording	01:05:37	3909
67	15/04/2015	Observation Session 28	Audio Recording	00:49:50	4876

68	16/04/2015	Observation Session 29	Video Recording	01:17:38	3656
69	16/04/2015	Observation Session 29	Audio Recording	01:05:14	6380
70	29/04/2015	Observation Session 30	Video Recording	01:08:10	3223
71	29/04/2015	Observation Session 30	Audio Recording	00:58:07	7176
72	29/04/2015	Observation Session 30	Fieldnotes		169
73	30/04/2015	Observation Session 31	Video Recording	01:26:28	4870
74	30/04/2015	Observation Session 31	Audio Recording	01:08:54	7983
75	20/05/2015	Observation Session 32	Video Recording	01:11:02	3979
76	20/05/2015	Observation Session 32	Audio Recording	01:03:05	7112
77	28/01/2015	Standardised Test	Drumcondra Irish Test 1		22 responses
78	21/05/2015	Standardised Test	Drumcondra Irish Test 2		23 responses
79	03/09/2014	Structured Survey 1	Student Questionnaire 1 (Pre-Intervention)		27 Responses
80	20/05/2015	Structured Survey 2	Student Questionnaire 2 (Post-Intervention)		20 Responses
81	04/03/2015	Structured Survey 3	Digital Badges for Learning in General: Student Opinion		27 Responses
82	05/03/2015	Structured Survey 4	Digital Badges for Learning Irish: Student Opinion		25 Responses
83	29/05/2015	Structured Survey 5	Parental Questionnaire		27 Responses
84	12/10/2015	Structured Survey 6	Follow-up Fourth-class		1 Response

			Teacher Questionnaire		
85	01/09/2014	Semi-structured Survey 7	National Teacher Survey (Online)		450 Complete Responses, 668 Partial Responses
86	12/10/2015	Semi-structured Survey 8	Fourth-class students		27 Responses
87	27/02/2015	Semi-structured Interview 1 (Survey Teacher)	Audio Recording	00:34:01	7195
88	04/03/2015	Semi-structured Interview 2 (Survey Teacher)	Audio Recording	00:55:19	8248
89	06/03/2015	Semi-structured Interview 3 (Survey Teacher)	Audio Recording	00:30:24	5833
90	10/09/2014	Semi-structured Interview 4 (Classroom Teacher)	Audio Recording	00:26:44	4430
91	21/01/2015	Semi-structured Interview 5 (Classroom Teacher)	Audio Recording	00:30:18	7048
92	29/04/2015	Semi-structured Interview 6 (Classroom Teacher)	Audio Recording	00:22:18	4842
93	06/08/2015	Semi-structured Interview 7 (Classroom Teacher)	Audio Recording	00:08:35	1476
94	11/06/2016	Semi-structured	Audio Recording	00:21:58	3501

		Interview 8 (Classroom Teacher)			
95	11/06/2016	Semi- structured Interview 9 (Sixth- Class Teacher)	Audio Recording	00:09:46	2142
96	24/09/2014	Open Feedback Session	Post-It Notes (23 students)		297
97	12/11/2014	Open Feedback Session	Post-It Notes (28 students)		721
98	19/11/2014	Open Feedback Session	Post-It Notes (29 students)		792
99	04/12/2014	Open Feedback Session	Coloured Stars (28 students)		157
100	21/01/2015	Open Feedback Session	Online Quiz (27 students)		512
101	11/02/2015	Open Feedback Session	Post-It Notes (25 students)		253
102	26/03/2015	Open Feedback Session	Post-It Notes (26 students)		354
103	15/04/2015	Open Feedback Session	Online Quiz (23 students)		533
104	Academic Year	Student Artefacts (135 Storyboards)	Handwritten Stories.		
105	Academic Year	Student Artefacts (520 Digital Creations)	Digital Stories. Animated Stories. Coded Stories [tagged, categorised]		
Total	60 weeks	32 Observation Sessions		~60:48:00 (Total number)	~271,888

		9 Interviews 8 Feedback Sessions 2 Language Tests 6 Surveys 655 Student Artefacts		of hours of Video and Audio recorded)	(Total Word Count Transcribed)
--	--	--	--	--	---------------------------------------

APPENDIX C

Lesson Plan and Materials for Design Cycle One – Digital Storytelling

Table 11.2: Lesson Plan

<p>Plean Ceachta 05/11/2014 (1.15 – 2.45)</p> <p>Díreofar ar an ainm briathartha agus ar an bhfoclóir a ghabhann leis an seomra ranga sa cheacht seo (Caibidil a Cúig – Rossa Bocht). Tá giotáí de chaibidil a Seacht (Lá sa Pháirc) san áireamh anseo chomh maith: ina luí, ina suí, srl.</p> <p><i>The verbal noun (ag canadh, ag léamh, ag caint) is usually covered with the progressive tense of state-of-being verbs (ina suí/ina luí/ina seasamh).</i></p> <ul style="list-style-type: none">• Cuirfear quiz beag ar na daltaí maidir leis an bhfoclóir a ghabhann leis an seomra ranga• Seinnfear an scéal digiteach Mo Sheomra Ranga do na daltaí• Déanfar súil siar ar an aip gréasáin ABCya Paint (http://www.abcya.com/abcya_paint.htm) agus ar an suíomh Idirlín My Cute Graphics (http://www.mycutegraphics.com).• Déanfaidh na daltaí clár scéalta an duine a leagan amach. Beidh an clár scéalta seo bunaithe ar théama Chabidil 5 – Rossa Bocht <p>Clár Scéalta</p> <ul style="list-style-type: none">• Tabharfar clár scéalta bán do gach dalta• Cuirfear sampla ar an gclár bán• Beidh ar gach dalta pictiúr mar aon le téacs a réiteach do na pointí tábhachtacha sa scéal, .i. tús, corp agus críoch<ul style="list-style-type: none">○ Bainfear úsáid as ABCya Paint le grafaicí a dhearadh○ Bainfear úsáid as My Cute Graphics le grafaicí a aimsiú

Plean Ceachta 12/11/2014 (1.15 – 2.45)

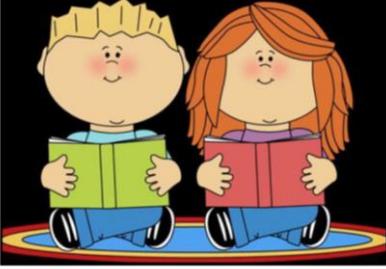
An scéal digiteach a dhearadh.

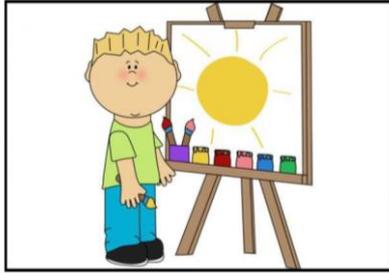
An Scéal Digiteach

Déanfar súil siar ar an aip gréasáin Little Bird Tales (<https://littlebirdtales.com/>)

- Cruthaigh scéal le sé leathanach ann
 - Caithfidh gach daltaí leathanach den scéal a chruthú
 - Bíodh pictiúr ar gach aon leathanach (pictiúr a roghnú agus a shábháil ón Idirlíon, nó a chruthú)
 - Bíodh téacs ar gach aon leathanach
 - Taifead do ghuth ag insint an scéil

Table 11.3: My Digital Story

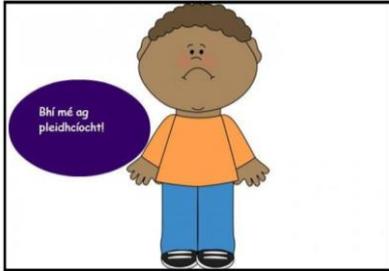
	 <p>Tá an mhúinteoir ag glaoch an rolla. Tá sí ina suí.</p>
 <p>Tá Susan ina suí ag an mbord. Tá sí ag éisteacht leis an mhúinteoir.</p>	 <p>Tá Conor ina shuí ag an mbord. Tá sé ag scríobh. Tá sé ag obair go dian.</p>
 <p>Tá Séamus agus Susan ina suí. Níl siad ag caint. Tá siad ag léamh.</p>	 <p>Tá Susan ina seasamh. Tá sí ag obair ar an rionnaire. Níl tuirse uirthi.</p>
 <p>D'fhág mé mo mhála scoile ar an mbus! Tá Séamus a mhála scoile ar an mbus. Tá fearg air!</p>	 <p>Tá na páistí ag súgradh. Tá siad ag gáire!</p>



Tá Séamus ina sheasamh.
Tá sé ag dathú.



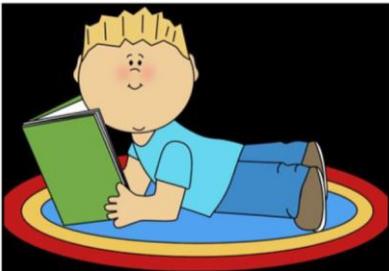
Tá sé in am lóin!
Tá ocras agus tart mór ar Shilé.



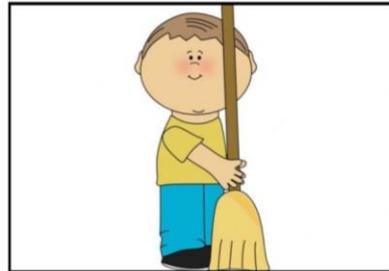
Bhí Conor ag pleidhíocht.
Tá brón air!



Tá Neasa ina luf ar an mata.
Tá sí ag léamh.



Tá Conor ina luf ar an mata.
Tá sé ag léamh.



Tá sé in am dul abhaile!
Tá Dara ag scuabadh.



Tá Neasa ag glanadh suas.



Tá Síle ina sheasamh.
Tá a mála scoile ar a droim.
Tá sí ag dul abhaile. Tá áthas uirthi!



The following is an example of a word cloud that I created for students to help them with their story writing.

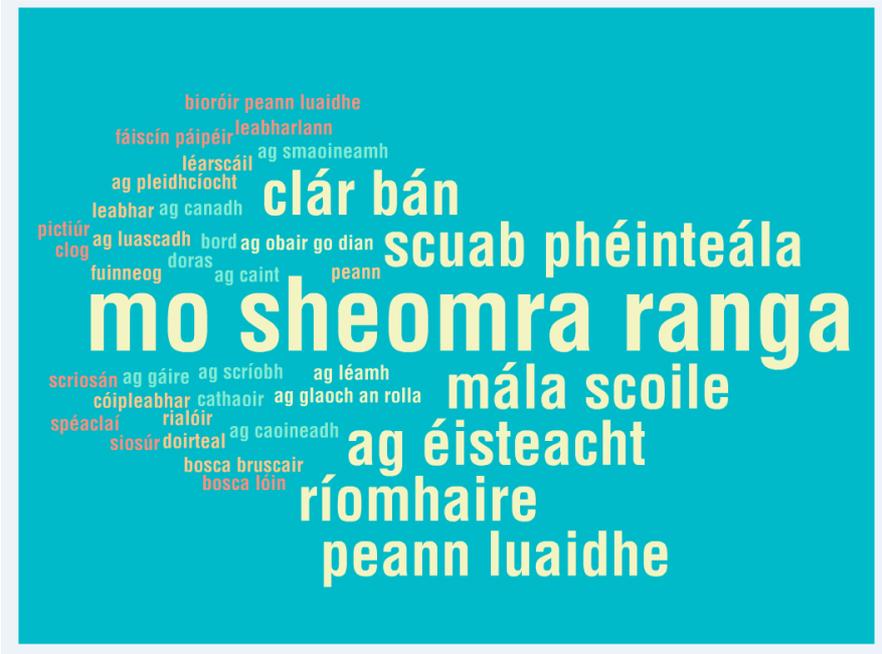


Figure 11.2: Vocabulary Word Cloud

Lesson Plan and Materials for Design Cycle Two – Animated Storytelling

Plean Ceachta 04/02/2015 (1.15 – 2.45) [Lesson Plan]

Díreofar ar théama na haimsire agus an éadaigh sna seisiúin seo [We will cover the following two themes in this lesson: weather and clothing items]

Díreofar ar chaibidlí a hocht (Siúlóid sa Pháirc) agus a sé déag (Sneachta) [This lesson is based on chapter 8, Walk in the Park, and chapter 16, Snow]. Is san aimsir chaite atá siad lonnaithe [This story is set in the past tense]. Sa bheochan seo, déanfar tagairt de [This animation encompasses]:

- na laethanta na seachtaine [days of the week];
- na séasúir [seasons];
- an aimsir [weather];
- na héadaí [clothes].

Ina dteannta sin, déanfar tagairt de na frásaí seo a leanas [This animation includes the following phrases]:

- ‘Féach ar an...’ (féach ar an bhfear sneachta) [Look at the...snowman];
- ‘Lá griannmhar a bhí ann’ [It was a sunny day];
- ‘An Domhnach a bhí ann’ [It was Sunday];
- ‘ar ais’ (ar ais ar scoil) [back...back to school];
- Thug...do’ (thug an múinteoir obair bhaile dom) [Gave...to, the teacher gave me homework].

Séasúir agus Éadach teideal na beochana seo [This animation is called Seasons and Clothes]:

- Seinnfear an ghearrthóg bheochana do na daltaí [Play the animation];
- Déanfar súil siar ar an aip gréasáin Go Animate agus taispeánfaidh na mac léinn a mbeochaintí (<https://goanimate4schools.com/school/nuigalway>) [Look back at GA and students present];
- Déanfaidh na daltaí, ina mbeirteanna, clár scéalta a leagan amach. Beidh an clár scéalta seo bunaithe ar théamaí Chabidlí 8 agus 16 [Students will complete their storyboards in pairs based on chapters 8 and 16].

Clár Scéalta

- Tabharfar clár scéalta bán do gach beirt [Distribute storyboards];
- Cuirfear sampla ar an gclár bán [Run through a sample on the board];
- Beidh ar gach beirt pictiúr mar aon le téacs a réiteach do na pointí tábhachtacha sa scéal, .i. tús, corp agus críoch [Students write their story in scenes, incorporating a beginning, middle and end, and include drawings].

Plean Ceachta 05/02/2015 (9.00 – 11.00)

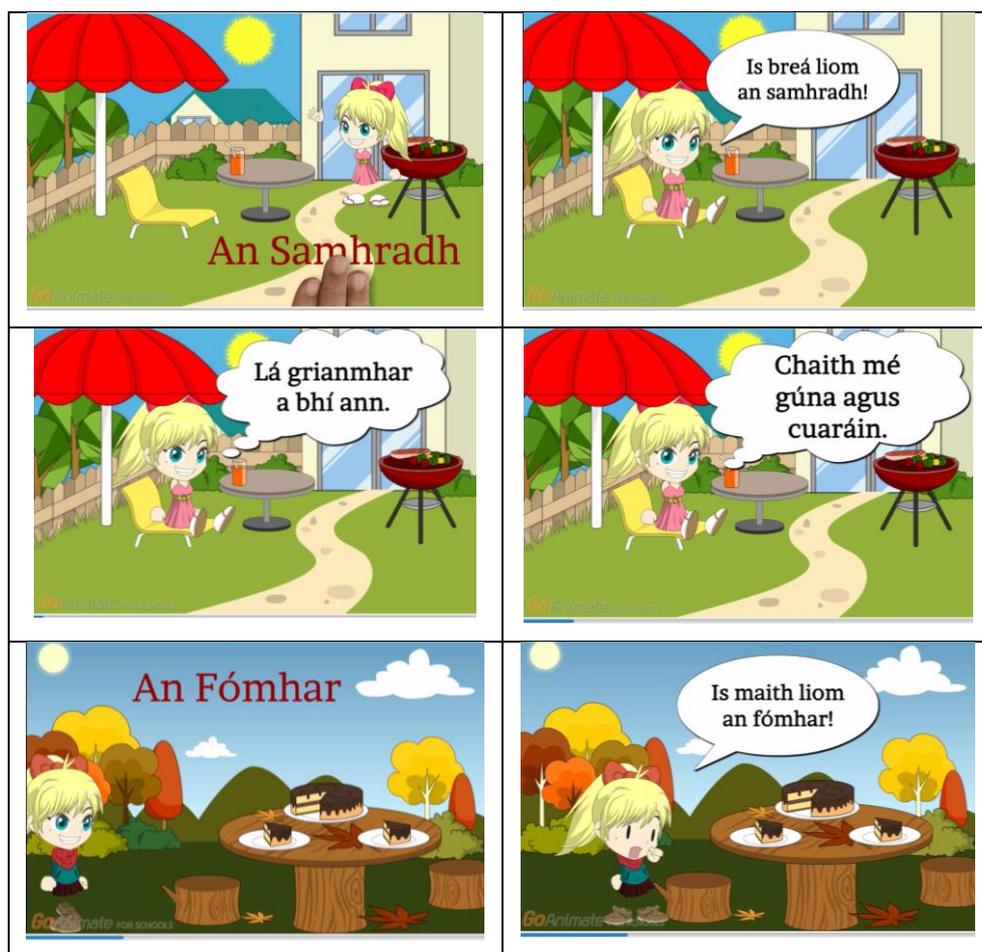
Gearrthóg Bheochana a dhearadh ag úsáid Go Animate [Design your animation in GA].

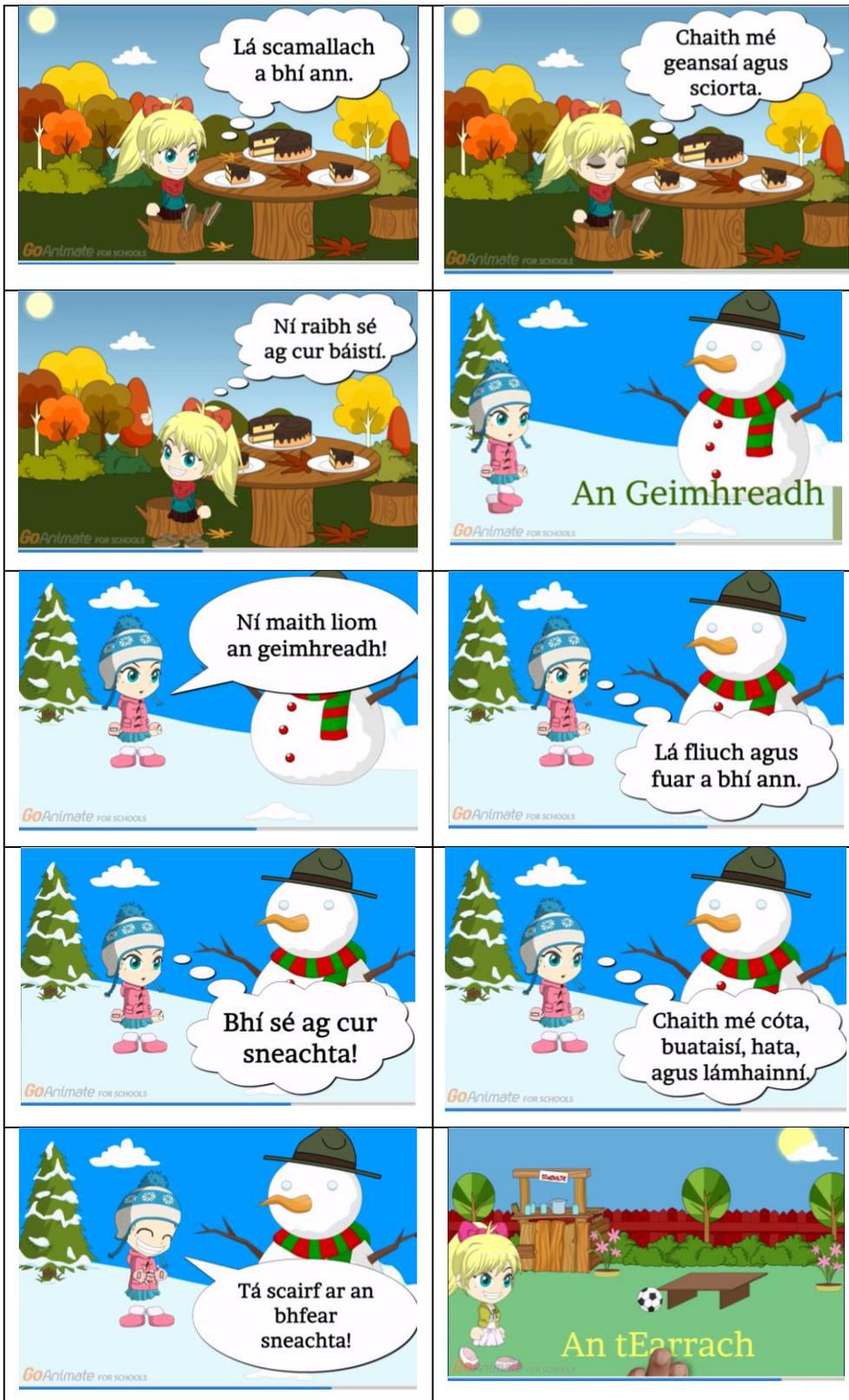
An Ghearrthóg Bheochana

- Déanfar súil siar ar an aip gréasáin Go Animate (<https://goanimate4schools.com/school/nuigalway>) [Review GA app];
- Cruthaigh scéal le 4 leathanach/radharc ann [Create a story with our scenes];
- Caithfidh gach dalta leathanach den scéal a chruthú [Every student must design one scene];
- Bíodh pictiúr ar gach aon leathanach [Include a picture on each scene];
- Bíodh téacs ar gach aon leathanach [Include text on each scene];
- Taifead do ghuth ag insint an scéil [Record your voice narrating you story];
- Cuir giota ceoil nó éifeacht fuaime leis [Add some music/sound effects].

This animated story describes each of the four seasons, paying particular attention to weather and clothing items.

Table 11.4: My Animated Story







Lesson Plan and Materials for Design Cycle Three – Animated Storytelling using Scratch

Plean Ceachta 25/03/2015 (1.15 – 2.45) [Lesson Plan]

Díreofar ar an téama *Bia* sna seisiúin seo [We will look at food items in this lesson]. Díreofar ar chaibidil a dó dhéag (Subh) [This lesson is based on chapter 12 called Jam]. Is san aimsir chaite atá sé lonnaithe [This story is set in the past tense]. Sa bheochan seo, déanfar tagairt de na coda seo a leanas [This animation encompasses]:

- Bia [food];
- an chistin [the kitchen];
- corp [the body];
- éadaí [clothes];
- ar an + urú [eclipse].

Ina dteannta sin, déanfar tagairt de na frásaí seo a leanas [This animation includes the following phrases]:

- ‘Am tae a bhí ann’ [It was tea time];
- ‘B’fhéidir go bhfuil sé sa chistin’ [Maybe it is in the kitchen];

Subh teideal na beochana seo [This animation is called Jam]:

- Seinnfear an ghearrthóg bheochana do na daltaí [Play the animation];
- Reachtálfar quiz bunaithe ar an ngearrthóg bheochana [Run the quiz];
- Déanfar súil siar ar Scratch (<http://scratch.mit.edu/>) [Look back over Scratch];
- Déanfaidh na daltaí, ina mbeirteanna, clár scéalta a leagan amach. Beidh an clár scéalta seo bunaithe ar théamaí chabidil 12 [Students will complete their storyboards in pairs based on chapters 8 and 16];
- Taispeánfaidh mic léinn a mbeochaintí ón mbaile [students present their animations from home].

Clár Scéalta

- Tabharfar clár scéalta bán do gach beirt [Distribute storyboards];
- Cuirfear sampla ar an gclár bán [Run through a sample on the board];
- Beidh ar gach beirt pictiúr mar aon le téacs a réiteach do na pointí tábhachtacha sa scéal, .i. tús, corp agus críoch [Students write their story in scenes, incorporating a beginning, middle and end, and include drawings].

Plean Ceachta 26/03/2015 (9.00 – 11.00)

Gearrthóg Bheochana a dhearadh ag úsáid Scratch [Design your animation in Scratch].

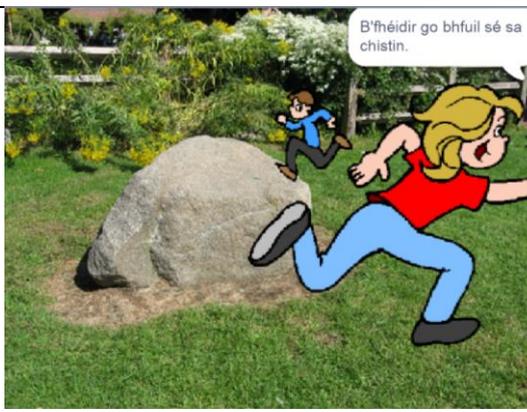
An Ghearrthóg Bheochana

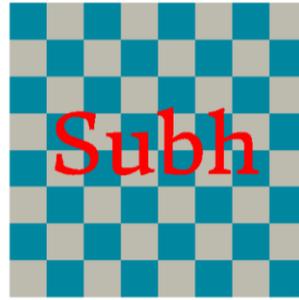
- Déanfar súil siar ar an aip gréasáin Scratch [Review Scratch app];
- Cruthaigh scéal le 4 leathanach/radharc ann [Create a story with our scenes];
- Caithfidh gach dalta leathanach den scéal a chruthú [Every student must design one scene];
- Bíodh pictiúr ar gach aon leathanach [Include a picture on each scene];
- Bíodh téacs ar gach aon leathanach [Include text on each scene];
- Taifead do ghuth ag insint an scéil [Record your voice narrating you story];
- Cuir giota ceoil nó éifeacht fuaime leis [Add some music/sound effects];
- Taispeánfaidh na mic léinn a mbeochaintí ag deireadh an tseisiúin – na cinn a dheineadar sa rang [Students present their animations at the end of class].

This story is based on chapter 12 in their Irish textbook and incorporates an Irish poem called 'Subh' (Jam). It is illustrated below in its various scenes in tabular format.

Table 11.5: My Coded Animated Story

<p>Subh! Subh! Subh!</p> 	 <p>Am tae a bhí ann.</p>
 <p>Bhí Neasa, Rossa agus Clíona ag súgradh sa ghairdín.</p>	 <p>Bhí Gordó sa ghairdín freisin.</p>

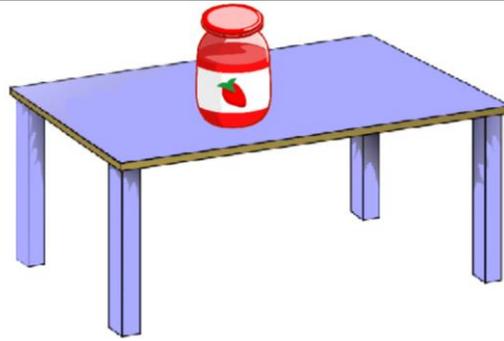




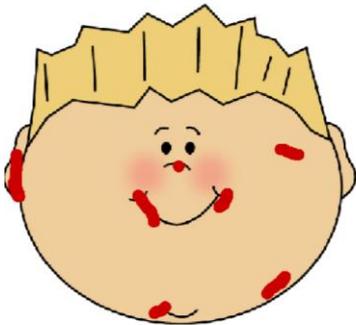
Bhí subh ar an urlár.



Bhí subh ar an gcathaoir.



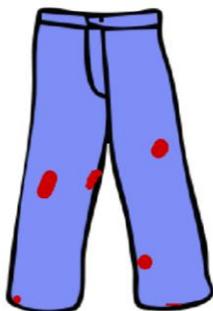
Bhí subh ar an mbord.



Bhí subh ar a aghaidh.



Bhí subh ar a lámh.



Bhí subh ar a bhríste.



Bhí subh ar a gheansaí.



Table 11.6: Quiz Based on my Scratch Story



by MasteryConnect

Name: _____ Date: _____

Quiz name: **Subh**

1. Cé a bhí ag súgradh sa ghairdín?

A Bhí Mamáí, Neasa agus Gordó ag súgradh.
 B Bhí Neasa, Rossa agus Séimí ag súgradh.
 C Bhí Séimí, Neasa agus Rossa ag súgradh.
 D Bhí Neasa, Rossa agus Cliona ag súgradh.
 E Bhí Cliona, Gordó agus Neasa ag súgradh.



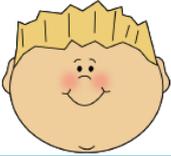
2. Cad a bhí á dhéanamh ag Mamáí?

A Bhí Mamáí ag súgradh.
 B Bhí Mamáí ag crochadh éadaí ar an líne.
 C Bhí Mamáí ag garraíodóireacht.
 D Bhí Mamáí ag ithe lóin.
 E Bhí Mamáí ina suí.



3. An raibh Séimí sa ghairdín?

A True
 B False



4. Cé a rith isteach sa chistin?

- (A) Mamáí
- (B) Neasa
- (C) Séimí
- (D) Gordó
- (E) Rossa



5. Cá raibh Séimí ina shuí?

- (A) Bhí sé ina shuí ar an mbord.
- (B) Bhí sé ina shuí ar an gcuntar.
- (C) Bhí sé ina shuí ar an gcathaoir.
- (D) Bhí sé ina shuí ar an urlár.
- (E) Bhí sé ina shuí ar an mata.



6. An raibh subh ar a gheansaí?

Page 1 of 2

(A) True

(B) False



7. An maith leat subh?

(A) True

(B) False

