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EMPOWERING LEARNERS WITH SELF-SELECTING LEARNING TOOLS

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Abstract

Students need to be encouraged while in the liminal space (i.e. the learning journey in the process of mastering a threshold concept) [1], [2] However, this learning journey can either be a positive/negative experience and the time spent negotiating this space can depend on the learner-educator relationship [3]. Students may also experience increased insecurities and doubts during their learning journey [4]. Therefore, rethinking curriculum design and placing the student at the centre of the design process can be used to invite students to enter liminal spaces and to dampen negative experiences thereof [5].

The development of an effective constructive alignment process can be used in curriculum design such that: (a) students are supported in achieving learning outcomes (LOs) and (b) students are encouraged in linking assessment with learning, thereby showing that assessment can be used to strategically change the way they learn [6], [7]. Effective curriculum design should focus on 'fitness for purpose' LOs to provide students with critical key graduate attributes (e.g. high levels of cognitive ability, leadership, entrepreneurial, analytical and critical thinking skills etc.). It should also incentivise students to manage their workload, engage with the module and be supported in a holding environment through the liminal space (until mastery of the threshold concepts is reached), achievable through creative continuous assessment via self-selecting learning tools. This represents a move away from over-assessing students, into more activity-based practice where students learn by doing. It also underpins key graduate attribute development and aligns with the four purposes of assessment as outlined by [8]; certification, student learning, quality assurance and lifelong learning capacity.

In this paper, the use of Self-Selecting Learning Resource Assessment Tools as part of the Operations Engineering module curriculum re-design, with the goal of incentivizing students to manage their workload and empower them to achieve the LOs, is described and evaluated.

Keywords: Self-selecting learning, liminal space, threshold concept, assessment, graduate attributes, constructive alignment

1 INTRODUCTION

Curriculum design which focuses on 'fitness for purpose' learning outcomes (LOs) can provide students with critical key graduate attributes (e.g. high levels of cognitive ability, leadership, entrepreneurial, analytical and critical thinking skill etc.) [9]. However, LOs in turn need to be congruent with [10]:
- Curriculum aims, scope and structure.
- Teaching and learning activities.
- Learning support.
- Students' backgrounds, knowledge and aspirations.
- Assessment and feedback.
- Course organisation and management.

In curriculum design, the alignment of LOs, teaching and assessment (through a constructive alignment framework) can be used to underpin the curriculum in a way which supports learners to achieve LOs and encourages them to link assessment with learning thereby showing that assessment can be used to strategically change the way they learn [6], [7]. Such alignment should also scaffold students in achieving high quality LOs [11]. Activity based practice where students learn by doing and where their time in the liminal space (and subsequent mastery of threshold concepts) is maximised, represents a move away from over-assessing students whilst also aligning with the four purposes of assessment as outlined by [8]; certification, student learning, quality assurance and lifelong learning capacity. The

linking of assessment with activity based learning can also strategically change the way students learn [6]. In a study of the inverted classroom by [12], student behavior altered through the inversion process as they felt more motivated and had a greater responsibility for their own learning due to their participation in problem and activity based exercises. Inverting the classroom is a recommendation for bridging the gap between the instructors' teaching style and a student's learning style thereby scaffolding student learning [12].

2   METHODOLOGY

Self-selecting learning resources such as online quizzes, videos, Uniform Resource Locators etc. were used to provide a scaffold for student learning and facilitate their transition through the liminal space in the mastery of the identified threshold concepts. The assessment component of the self-selecting learning resource tools was part of a constructive alignment process for the Operations module curriculum re-design, in the Academic year 2015/2016. In order to assess the effectiveness of self-selecting assessment tools as empowerers of LO achievement, a survey was deployed to 364 undergraduate students, with a 13.7% response rate. The aims of the survey were to:

(1) elicit the effectiveness of self-selecting learning resource assessment tools;
(2) assess whether or not, the use of self-selecting learning resource assessment tools resulted in an impact on the final mark awarded;
(3) determine the effectiveness of self-selecting learning resource assessment tools as portals/learning thresholds.

Anecdotal comments from the students in italics in [] will be used to relate their perceptions of their journey through the liminal space and their views on self-selecting learning tools.

2.1   Self-Selecting Learning Resource Assessment Tools as part of the Operations module curriculum re-design

As thinking takes time, educators seldom allow students the time to think [13]. While educators can employ various engagement strategies to encourage students to spend time in a holding environment in the liminal space described as "the learning journey in the process of mastering a threshold concept" (and thereby learning) [2], this journey can either be a positive or negative experience and the length of time spent negotiating it can depend on the student-educator relationship [3]. Students may also experience increased insecurities and doubts whilst navigating the liminal space [4]. Rethinking curriculum design and being mindful of placing students at the centre of the module re-design process can lend itself to both inviting students to enter liminal spaces and to dampening negative experiences thereof [5]. With this in mind, the provision of learning resources where learners learn by doing through self-managed activity-based continuous assessment tools was the catalyst for LO realignment in the Operations module curriculum re-design.

The aims of this LO realignment were to:

- incentivise students to manage their workload, engage with the module and be supported in a holding environment through the liminal space until mastery of the threshold concepts were reached;
- encourage students to appreciate the value and enjoyment of learning and move way from a focus on marks awarded for assessment to assessment as a learning objective;
- engage students on-line and in-class;
- position continuous assessment (CA) as the following LO: Complete several self-assessment tests to reinforce the students' knowledge of their subject and help in preparation for the final written examination;
- provide students with full access to databanks
- link class-based activities with the on-line self-assessment tests (SATs) in order to meet the learning objectives of the module and create value for students. Engaged students are more responsive and inquisitive in their learning and are more likely to succeed in mastering the threshold concepts in a shorter timeframe within a holding environment [1].

The Operations module is an interdisciplinary module taught to a multidisciplinary group of 2ⁿᵈ year students. This 5 ECTS module is delivered to between 350 and 410 students each year, takes place in Semester II, is core to all students and provides fundamental information and operations flow principles for other modules taking place in final year.

The interdisciplinary nature of the Operations module makes it challenging in terms of design, delivery and assessment for both the educators and the students. However, as [9] suggests; modules which bridge disciplines have the advantage of "developing new approaches to solving complex problems or tackling issues that cannon be easily solved using a single approach" it is necessary to get the "fit" right in order to develop the most appropriate student attributes (high level cognitive, leadership, entrepreneurial, analytical etc.). The main driver for curriculum re-design in this case study was the desire to increase the value of CA through SAT engagement, so that student learning and engagement was deepened.

Reflecting on the effectiveness of the teaching and learning activities, this study involved completely removing the continuous assessment marks. SATs in their new form provided students with more autonomy in their learning through the availability of repetitive SATs which students could access 24/7 after a topic was complete. This meant that the students controlled this component of their learning and used the SAT as an on-line activity which could be accessed as frequently as they wished. The SAT feedback was automatic and students received a result after each test. The intention was to encourage students to do multiple test activities on a topic until they were comfortable with their learning and understanding of the related content and had reached a mastery of the threshold concepts associated with that content.

3   RESULTS

The purpose of the SATs deployed through the institutional technological space was to reinforce lecture content and provide essential preparation for the final end of semester examination, worth 100%. Student engagement was not an issue as over 90% of students engaged on-line with the course resources.

Note: technological space refers to the institutional virtual learning environment (VLE) where course resources are provided.

The results of the survey are presented thematically based on the research questions.

Research question 1: Are self-selected learning resource assessment tools effective?

Students actively participated in the on-line SATs working regularly (37%) and occasionally (56%). 7% engaged rarely. Students rated the difficulty of work they were expected to do, as very easy (7%), fairly easy (37%) and fairly difficult (28%). As expected, students' perception of the time investment in learning differed from the actual time spent. When asked about the amount of time and effort spent engaged with the learning resources, 51% noted that they spent a lot of time and effort with 49% doing the minimum required. This is contradictory with the following; 2% spent 5-10 hours working on the module outside the classroom, 37% spent 3-5 hours, 49% spent 1-3 hours and 12% spent less than an hour. As a 5 ECTS module, the advised time input is between 100 and 125 hours. Some students exceeded the recommended workload whilst others were less compliant.

89% of the students agreed that the self-selected learning resource assessment tools complemented their learning. Whilst the use of such tools can empower students, it requires them to be organized and responsible for their own learning. 49% found this an easy task, while 35% found it difficult and 16% were unsure. in order to develop academic skills, students "need to be able to get themselves to do what they need to get done" [14].

[*I am just wondering if at some stage in the next week or two if you could put back up the continous online assesments we took for the last number of weeks. Would it be possible to put them up as practice assignments that you can take as many times as you like. I think they would be good study practice*]

[I think the blackboard test is much better than a written assessment as you get an instant result and blackboard is quite easy to use]

Research question 2: Does the use of self-selecting learning resource assessment tools result in an impact on the final mark awarded?

Table 1 shows the combined CA and Final exam results for the years 2013 and 2014 respectively. No results are available for 2015. In 2013 and 2014, the final exam and CA were weighted at 70% and 30% respectively. In 2016 and 2017, as part of the curriculum redesign to empower learners, self-selecting learning resource assessment tools (embedded in a technological space) were introduced and the final exam weighting was changed to 100%.

As can be seen in Table 1, the 2016 results improved slightly in comparison to the previous 2 years. However, in 2017 the results reverted to the 2013 average. The results over the next 3-5 years will be monitored to see if there is a continuing downward/upward trend.

Table 1. Examination results 2013 – 2017 (excluding 2015)

	2013 N=316	2014 N=332	2016 N=364	2017 N=391
CA (30%)	40%	45%	No CA	No CA
Final Written	57%	59%	56%	52%
Average	52%	55%	56%	52%

Research question 3: Are self-selecting learning resource assessment tools effective as portals/learning thresholds?

Effective curriculum design should focus on 'fitness for purpose' LOs to provide students with critical key graduate attributes (e.g. high levels of cognitive ability, leadership, entrepreneurial, analytical and critical thinking skills etc.) [6], [7]. It should also incentivise students to manage their workload, engage with the module and be supported in a holding environment through the liminal space (until mastery of the threshold concepts is reached) [5]. However, this journey can either be a positive or negative experience and the length of time spent negotiating it can depend on the student-educator relationship [3]. To encourage students to enter the liminal space, educators actively shared their enthusiasm for the Operations module as 70% of the respondents acknowledged the effectiveness of the educator's approach to sharing their enthusiasm. Some students required additional support in entering into and being held within the liminal space, with 68% of respondents agreeing that they were given the necessary supports to master the related threshold concepts.

[I wouldn't prefer written assessment. I find the MCQ test better because I am more comfortable when doing assessments on the computer, I feel it is very fair and I get my results straight away]

[*It was very adequate as it covered every chapter and the questions were relatively difficult so students needed to have the chapters learned to know the answers to the questions*]

[*The questions were clear and unambiguous (before I had the panic attack!!)*]

In addition to mastering the threshold concepts associated with the Operations module, students gained additional skills; 50% said that they were more organized and responsible for their own learning after completing the module; 26% not much/very little with 24% being unsure.

[*I was hoping to meet you .. I just basically want to know how to prepare for this subject. I am really confused and all the different systems are making me scared coz I am reading the core texts and i can't figure out how am i going to bring it together for the exam. Should I just follow the lecture notes and write notes from the book or simply learn it from the book?*]

In summary, the re-drafted assessment activities for the Operations module aimed to address student disengagement from the classroom and support their engagement via on-line technology based learning. The move away from rigid once off assessment to more flexible assessment methods is key to achieving deep learning. The aim of tweaking the LO's assessment layer was to encourage students to appreciate the value and enjoyment of learning and move from a focus on marks awarded for assessment to assessment as a learning objective. Whilst the terminal exam covered the entire module content, the students were able to self-test multiple times after each topic. However, the results of this study suggest that the use of self-selecting learning resource assessment tools can scaffold students' learning. Whilst such tools have not significantly impacted on the final mark awarded, students indicated that they were given sufficient supports to master the content and learned additional skills in the process. However, the lack of impact on their academic performance may be due to a number of inter-related factors such as their lack of engagement with deep learning (focussing mainly on the final exam and not on the journey through the holding environment), their lack of management of their own learning, the difficulty of taking responsibility for their own learning and their anxiety about the self-selecting learning process.

4   REFLECTION FROM THE INSTRUCTOR

"On reflection, I hope the re-design will engage the students with the module. I am never happy with the status quo and I will continue to re-design parts of the Operations module and improve on what I do each year. I hope that the change will have a positive impact on student engagement. In my opinion, there is far too much emphasis on exams and results rather than a focus on achieving a mastery of threshold concepts. The irony is that academics are responsible for the system driving this. For me, student engagement, deep learning and their enjoyment of the learning process gives me a 'buzz'. I aim to continue monitoring the impact of the implementation of self-selecting learning assessment tools and further changes on student performance and engagement".

5   CONCLUSIONS

A move away from over-assessing students, into more activity based practice where students learn by doing is recommended [8]. In this paper, the authors present their use of self-selecting learning resource assessment tools as part of the Operations module curriculum re-design. Students are encouraged to engage with module resources and varied self-assessment tools (SATs) within a technological space provided on the institutional VLE – Blackboard. As part of the Operations module curriculum re-design, the weighting for the summative exam was changed from 65% (up to 2015) to 100% (2016 onwards). SATs were available but were not graded. They provided a scaffold for student learning and empowered students to control their learning.

In order to assess the effectiveness of the self-selecting learning resource assessment tools, a survey was deployed to 364 undergraduate students, with the aims of;

(1) eliciting the effectiveness of self-selected learning resource assessment tools;
(2) assessing whether or not, the use of self-selected learning resource assessment tools resulted in an impact on the final mark awarded;
(3) determining the effectiveness of self-selected learning resource assessment tools as portals/learning thresholds.

Based on an analysis of the results, the authors argue that on-line resources and self-selecting online assessment tools can empower some students to be responsible for their learning. While other students need to be more supported into and facilitated through the liminal space, in the mastery of threshold concepts, the majority gained from the experience with 89% agreeing that the use of self-selected learning resource assessment tools complemented their learning. As this study focussed on the use of SATs as an LO rather than as an assessment, it provided the option to alter the use of the on-line self-assessment MCQs to facilitate and encourage student engagement with the content. This aligns with more creative assessment practices and a move away from over assessing students and into more activity based practice where students will learn by doing [8].

The results show that after engagement with the module, 50% of students had increased confidence and organisational skills. In summary, it made sense to integrate the SAT component as part of the LOs in the redesign of the Operations module thus positioning SATs as aids and learning tools rather than assessments.

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6 REFERENCES

[1] R. Land and al, "Learning in the liminal space: A semiotic approach to threshold concepts," *Higher Education 67.2 (2014): 199-217.,* pp. 199-217, 2014.

[2] J. Meyer and R. Land, Threshold concepts and troublesome knowledge: Linkages to ways of thinking and practising within the disciplines, UK: Oxford: Oxford Centre for Staff and Learning Development., 2003.

[3] U. Lucas, "Being ''pulled up short'': Creating moments of surprise and possibility in accounting education," *Critical Perspectives on Accounting,* vol. 19, no. 3, p. 383–403., 2008.

[4] G. Cousin, "Threshold concepts, troublesome knowledge and emotional capital. Overcoming Barriers to Student Understanding: Threshold Concepts and Troublesome Knowledge," *Ed. Jan Meyer and Ray Land. UK: Routledge,* pp. 134-147, 2006.

[5] M. Dempsey and A. Brennan, "TURBOCHARGING THE JOURNEY INTO THE LIMINAL SPACE AND BEYOND," in *INTED2017 Proceedings, pp. 4315-4324*, Valencia, 2017.

[6] G. Gibbs, Assessment Matters in Higher Education Choosing and Using a Diverse Approach, UK: McGrath Hill, 1999.

[7] J. Biggs, "What the student does: teaching for enhanced learning," *Higher Education Research and Development Volume 31, Issue 1: 30TH ANNIVERSARY ISSUE,* pp. Pages 39-55, 2012.

[8]   S. Bloxham and P. Boyd, Developing Effective Assessment In Higher Education: A Practical Guide: A Practical Guide., UK: McGraw-Hill Education, 2007.

[9]   P. Ashwin and al, Reflective Teaching in Higher Education. Reflective Teaching, UK: Bloomsbury Publishing, (2015).

[10]   D. Hounsell and J. Hounsell, "Teaching-learning environments in contemporary mass higher education," *British Journal of Educational Psychology,* vol. BJEP Monograph Series II, no. 4, p. 91–111, 2007.

[11]   J. Biggs and C. Tang, Teaching for Quality Learning at Univeristy, UK: McGrath-Hill, 2011.

[12]   M. Lage and al, "A gateway to creating an inclusive learning environment," *The Journal of Economic Education 31.1,* pp. 30-43, 2000.

[13]   M. Jackson and M. Prosser, "Less lecturing, more learning," *Studies in Higher Education 14.1,* vol. 14, no. 1, pp. 55-68, 1989.

[14]   A. Hazri, "Students must take responsibility for their own learning," 2014. [Online]. Available: http://www.scmp.com/lifestyle/family-education/article/1618574/students-must-take-responsibility-their-own-learning. [Accessed 2018].

[15]   G. Cousin, "Threshold Concepts, Troublesome Knowledge and Learning about Others," Italy, 2003.

[16]   H. Wright and P. Ashwin, Questioning the relations between biography, theory and power in biographical teaching methods: a dialogue, UK: Taylor & Francis On-line, 2011.

[17]   O. Harmon and al, "Assessment design and cheating risk in online instruction.," *Online Journal of Distance Learning Administration,* 2010.

[18]   B. Bevan and J. Dillon, "Broadening Views of Learning: Developing Educators for the 21st Century through an International Research Partnership at the Exploratorium and King's College London," *New Educator,* vol. 6, no. 3-4, pp. 167-180, 2010.

[19]   L. Chipchase and al, "Conceptualising and Measuring Student Disengagement in Higher Education: A Synthesis of the Literature," *International Journal of Higher Education.,* vol. 6, no. 22, pp. 31-42, 2017.

[20]   D. S. White and A. LE Cornu, "Visitors and Residents: A new typology for online management," *First Management,* vol. 16, no. 9-5, 2011.