S4 Caldicot Friday 7 December 9.45 -10.15

Applying learning design to identify areas of improvement in 1st year Mathematics modules at the University of South Africa (0376)

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Introduction

University of South Africa (UNISA) is the largest distance education provider in Africa and is one of the oldest universities with more than 350,000 students. UNISA has a very special role within the HE landscape of the post-apartheid South Africa. One of the paramount missions of the university is to widen the access to HE. Being a public HE institution, student success and attrition is a major concern.

Number of studies conducted in online distance HE (Nguyen, Rienties, & Toetenel, 2017; Rienties & Toetenel, 2016) found that learning design of the module correlated with students' engagement in Virtual Learning Environment and their attainment on the course as well as satisfaction. Those studies were done in the context of the largest distance education provider in UK, the Open University UK.

Learning Design (LD) is a field of educational research and scholarship that focuses on the designing, describing and sharing of learning activities, to support educators' design practices. It is about designing for student engagement with learning tools, materials and communities. Conole (2012, p121) describes learning design as "a methodology for enabling teachers/designers to make more informed decisions in how they go about designing learning activities and interventions, which is pedagogically informed and makes effective use of appropriate resources and technologies".

The purpose of this study is to examine whether LD used at the OU can be applied in a context of UNISA and what are the challenges in doing so.

Method and Results

This study adopted an action research approach, which is any research into practice undertaken by those involved in that practice, with an aim to change and improve it (Open University, 2005). It can also be seen as a "[…] systematically investigate one's own teaching/learning facilitation practice with the dual aim of modifying practice and contributing to theoretical knowledge" (Norton, 2009, p. xvi). In order to test the applicability of LD in UNISA settings this study worked with the two level 1 Mathematics modules (Module 1 is a year-long module and Module 2 is a semester-long module) with the large and diverse populations in the Science, Engineering and Technology (CSET) faculty.

In order to reach the aim of this research, two different sources of data were gathered to provide insight into the student experience. Firstly, the learning designs of these modules were evaluated using OU LD approaches and tools. Student workload and balance of activities were mapped, using the OU's online learning design tool to code the amount of module-directed workload and the range of activity types that students are required to engage in. Secondly, students' academic performance on this module from 2010 till 2016 was

retrieved from the UNISA database and analysed to determine overall trends in students successfully passing the module and achieving learning outcomes of the module.

Students' attainment on the module was coded into three categories: 1) module failed, 2) absent/non-submission of assessment, 3) module passed. The results of the historical progression trends for Module 1 are presented in Figure 1 below.

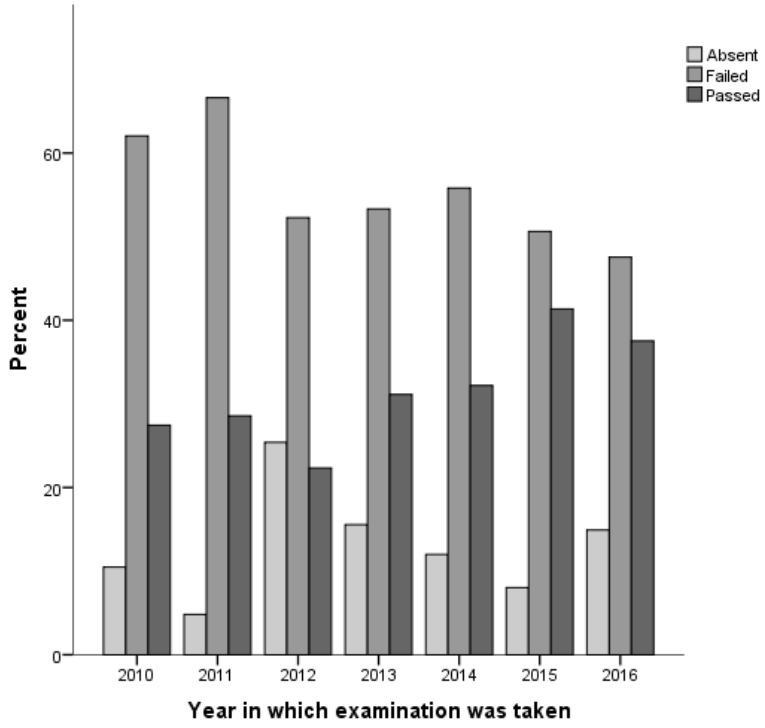

Figure 1.

As can be seen from the figure, the pass rates and therefore retention are consistently low over the years, which suggests that the causes do not just lie with individual students or particular cohorts. Mapping of LD for this modules have revealed the potential problems with the workload that could result in students missing assessments and not preparing adequately for the examinations. The review of the workload identified uneven workload throughout the module with the particularly problematic times being months 4 and 7. In month 4 students were expected to study on average around 50 hours on this module, and the first assignment was due and students were expected to prepare for assignment 2. In month 7 students were expected to study on average 70 hours, and assignment 4 on Trigonometry was due and extra material was provided due to the difficulty experienced by students in assimilating the complexity of the content.

In order to see how successful students were in passing Module 2, the same coding as for Module 1 was used resulting in three groups of students: those who did not submit assessments or were absent during an assessment, those who failed the module and those who passed the module. The historical distribution of the module examination results for each academic year split by the semester 1 and 2 are presented in figure 2 below.

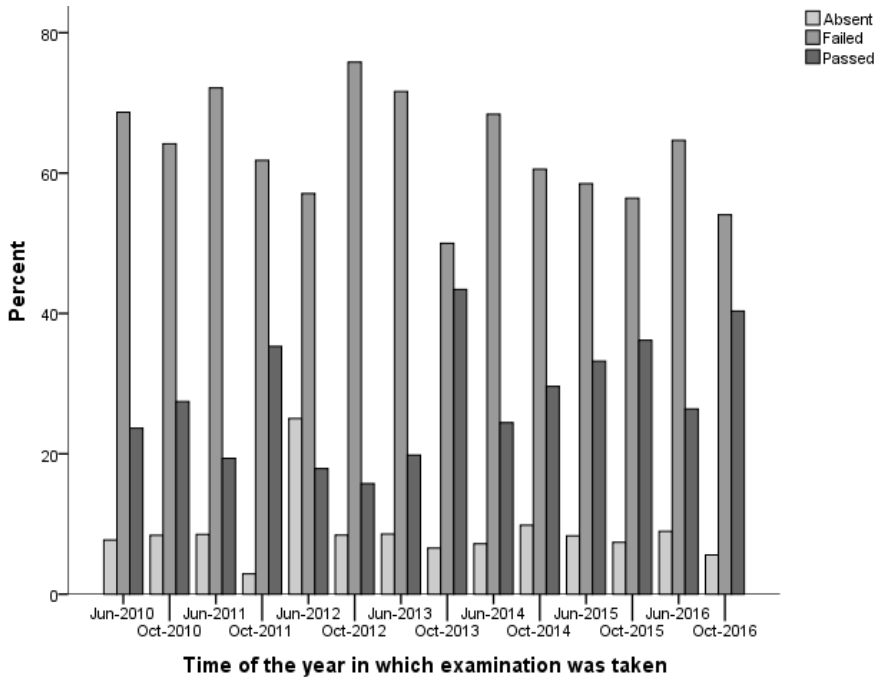

Figure 2.

As can be seen from the figure, overall there is a large majority of students who fail the module, and students who did their examination in June were more likely to fail than those students who did their examination in October. The Module 2 workload was as problematic as the one observed in Module 1. Weeks 7 and 8 were particularly heavy in terms of assimilative material workload, due to either a large amount of study material to assimilate in week 7 and prepare for written assignment 2.

Discussion

Applying LD OU to map out LD of the two Mathematics modules at UNISA showed that: 1) the actual workload of the modules was substantially larger than what was estimated by the module tutors and 2) the actual workload of the module was larger than what was suggested by module workload guidelines. Number of specific 'design challenges' were identified and included:

- Student diversity – we cannot assume a common starting point
- Language – the majority of students do not have English as their first language
- Africanization and decolonization of Maths subjects
- Lack of access to the internet (some students only have a cell phone; data is very expensive)
- Student retention
- Timings of assessment feedback so that students can act on it

The presentation will cover explanation and demonstration of learning design tools used to examine the workload on the module and specific recommendations made for improving Module 1 and Module 2 LD.

References:

Conole, G. (2012). *Designing for learning in an open world* (Vol. 4). Springer Science & Business Media.
Nguyen, Q., Rienties, B., & Toetenel, L. (2017). Unravelling the dynamics of instructional practice: a longitudinal study on learning design and VLE activities.
Rienties, B., & Toetenel, L. (2016). The impact of learning design on student behaviour, satisfaction and performance: A cross-institutional comparison across 151 modules. *Computers in Human Behavior*, *60*, 333–341.