Different horses for different courses: Which online resources/tools work for different learning purposes?

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CONTEXT

This article provides a case study which analyses the application of diverse online resources intended to enhance student engagement in post graduate courses in Project Management, delivered online and in class. These students are a diverse group of adult learners who work in different formats (e.g. Fly In Fly Out, shift work, open business hours etc.) and in different locations and time zones, therefore their online program needed to provide for asynchronistic learning and an adult learning pedagogy. The participants come from a wide range of professional backgrounds, with some having no Project Management experience, whilst others have 20 years or more of managing complex projects but no formal qualification. Students need to achieve the academic requirements of this Master's Degree, plus they have to gain an understanding of an advanced body of knowledge. To achieve this, the course educational designers had to identify what made learning interesting for this cohort and recognize different resources that could be used to stimulate their learning. What evolved were a number of different online learning resources within several courses within the MPM program, each designed to apply a different type of learning.

PURPOSE

What the researches seek to demonstrate is that by appreciating the characteristics of these learners, who they are, and how they learn, course developers need to develop online resources based on what they need to learn and achieve.

APPROACH

Different online learning resources/tools have been developed and introduced to the course. The online learning resources included: the development of video case studies; use of gamification; the creation of conflict and situational adversity, demonstrations utilising drop boxes and student interaction; video case studies and interviews. All these online resources required the development of extensive supporting documents, visuals, forums and activities. Both qualitative and quantitative data are being collected on the different online learning resources, including a comparison of student feedback matrices from before and after the introduction of the resources; student's comments and the lecturer views on students understanding gained.

RESULTS

These digital learning resources/tools are being used for the first time in 2016. Initial data and qualitative comments from students have been highly supportive of these digital resources and initiatives. Currently there have been some good reactions to different learning resources. As the courses continue to be implemented, more specific and further data will be collected.

CONCLUSIONS

Though restricted by the characteristics of your learners there are different resources that can be applied to provide an effective learning mechanism. What online learning resources you develop will depend on your student cohort and what type of learning is required. With limited financial resources, educational developers need to judge what are the most effective online resources for their client group, given their learning needs, characteristics and academic requirements.

KEYWORDS

asynchronistic learning; adult learning pedagogy; online resources.

Introduction

Communication Technologies and the internet are transforming education, taking it out of the traditional face-to-face (F2F) lectured classroom and making it open, affordable and dynamic. Universities, publishers, corporations and individual lecturers are all creating web based courses on the online platform. Online resources are developed for all the three categories of University of South Australia's courses: as complementary resources (online component supporting F2F delivery); as blended delivery (delivered both online and F2F) and as pure online (delivery is only online) (Kneebone 2014). Initially the focus was on pure online courses and for some courses offered in blended format, "at its simplest, blended learning is the integration of classroom face-to-face learning experiences with online learning experiences" (Jeffrey, 2012, p.4 cited in Meyer 2014, p.90). These online courses utilise resources consisting of: communication technologies, video clips, recorded lectures, electronic study guides, online tests, quizzes, interactive games and online submitted assignments. We have also seen the phenomena of MOOCs, Massive Open Online Courses where online courses are offered as a carrot to entice new students.

It is believed that this multimedia revolution has resulted in such things as: more/better learning than live instruction or older media (Means, 2009); more stimulating and motivational than other instructional delivery options; (Clark, 2016); provision of animated pedagogical platforms that aid learning (Mitchell, 2016); provision for different learning styles and so enhanced learning for more students (Beethan et al. 2013); and facilitation of student-managed constructivist and action learning approaches (Hutchins 2015) that are beneficial to learning. Feldon (in Mayer 2005 p.97) has questioned these commonly held beliefs. The view that you can simply convert a F2F course to an online course by adding some digital resources to replace in-class activities and get these benefits, does not appear to hold up in reality. The implication is that the use of multimedia learning, whether delivered via a pure online course or as a campus course using multi-media resources in a blended learning approach, is a more complex process. Increasingly, via course evaluations, students are requesting more integration of online tools in all their courses, but curriculum development is not simply a matter of adding new learning resources or tools, the fundamentals of learning have to be revisited starting with an understanding of who your students are, the level of study required and its alignment with Blooms Taxonomy (the taxonomy used in this program to match against the AQF levels). This case study looks at how we attempted to improve the delivery of online courses using the Masters of Project Management (MPM) programs as an example and provides the thinking and decision making behind which tools and techniques we used to develop new online resources.

The quality of the material and how it is structured has a big influence on student learning. Educational purposes and pedagogy, not just technologies, must guide the students' understanding not only how to work with online courses, but why they are of benefit for them to do so (Kirkwood 2005). The application of technologies should change the teaching experience for the better, not just be an 'additive approach' (Simpson 2008) to F2F. Knowing about students' use of media, as well as their attitudes and experiences, can help teachers and instructional designers develop enhanced courses and ensure students are provided with a high worth and digitally rich learning environment.

For engineering students Felder (2005) identifies three categories of diversity which have implications for teaching and learning, these are: the differences in students' learning styles (characteristic ways of taking in and processing information): the approaches to learning (surface, deep, and strategic); and finally, the intellectual development levels (attitudes about the nature of knowledge and how it should be acquired and evaluated). He suggests a variety of learning tasks as primary among the methods that have been recommended to address learning goals in all three diversity domains (op.cit.p. 67). Following this principle, the MPM courses are being transformed by extending the suite of learning resources and

learning tools that currently support teaching and learning. New digital learning resources and material, other interactive tools and techniques (Ispring, Videoscribe, Articulate Storyline, interactive surveys etc), are being explored and shared as part of the Universities approach to digital learning (UniSA, 2015). To present contemporary project events and situations, scenario case studies and demonstrations, while 'gamification' elements are being added to create interest and apply learning.

SPECIFIC CHARACTERISTICS OF THE STUDENT GROUP

The nature of Project Management (PM) meant that the students come from a variety of industries, bringing with them extensive professional experience and skills in a specialist area. PM at the post graduate level attracts students with an existing professional undergraduate qualification, including, but not limited to, engineering (Chemical engineering; Civil engineering; Electrical engineering; Mechanical engineering) and construction, but who may have no PM experience. PM courses also attract students who have extensive PM experience, often 20 years or more managing complex project, but who hold no formal qualifications in the area. The students required a mature adult learning pedagogy.

PM is a new and growing profession and educational area and so there is a greater diversity in the student body of today than ever before, universal access to the internet and the development of on-line material has enabled a more diverse range of users both online and on-campus. All courses are delivered over a semester of 13 weeks, but the MPM programs need to be provided in different formats depending on the program. Asynchronistic learning is provided for the on-line learning via Open University of Australia (OUA), while other deliveries of the program are provided as synchronistic learning for F2F or blended learning. The online students work across a range of time zones. Of the 2015 UniSA MPM program student cohort, only 5% were from overseas; the remaining students were from different states of Australia. However, while based in Australia, a large proportion of the students worked remotely or overseas. This means different time zones as well as different work schedules, different band widths and internet access. Asynchronous online learning offers a unique environment in which students differing learning styles need to be considered and managed (Clark, 2012). However we also needed resources which could be used also for synchronistic learning in the class room.

Student numbers for these courses have been growing consistently over several years. From profiling the students studying this Master program we found that they are: mature aged; problem-based learners; professionals who are time poor due to work and family commitment; requiring their learning to be asynchronistic and thought-provoking and relevant. We believe that the application of many digital tools and software works well for this distinctive group.

Students need to achieve the academic competencies as required by the PM profession, plus gain an understanding of an advanced body of knowledge academically as defined by the Australian Qualification framework (AQF, 2013). This program is based at an AQF level 8 and 9. The AQF used Bloom's taxonomy of knowledge, so the course is partly about procedural knowledge (knowledge of subject-specific skills and algorithms knowledge of subject-specific techniques and methods knowledge of criteria for determining when to use appropriate procedures) but as the student's progress through the study program, more metacognitive knowledge (strategic knowledge, knowledge about cognitive tasks, including appropriate contextual and conditional knowledge self-knowledge) is introduced (Anderson and Krathwohl 2001, p. 46). In terms of the cognitive process dimensions required for an AQF level 8 and 9 course, the focus was on providing a course platform that allowed students to analyse, evaluate and be creative in their thinking. Therefore, the online learning material and assessments we developed were focused on supporting students' skills and knowledge in checking, critiquing, hypothesising, planning and designing, producing.

The field of PM is new to most of the students, as they have come from other technical and specialist areas such as engineering, there is a need to initially consider inculcating the courses with lower level factual knowledge (knowledge of terminology knowledge of specific details and elements relevant to PM) and the conceptual knowledge (knowledge of classifications and categories knowledge of principles and generalizations knowledge of theories, models, and structures) (AQF 2013) to align their knowledge with those students experienced in PM. The online tools and learning activities, particularly in the initial four foundation courses, needed to therefore focus more on these lower level knowledge dimensions.

LEARNING METHODOLOGY

A key issue within eLearning (and training in general) is providing resources, learning and assessment activities to motivate students will want to invest the time and effort required to learn (Inigo 2015). Research shows that a higher number of students participating in online courses dropout than those studying in a F2F situation (Dietz-Uhler, et. al. 2007). This current group of online MPM learners was typical of adult learners who had similar characteristics to those Knowles (1984) described in the past, who:
- Used experience (including mistakes) provides the basis for the learning activities.
- Are most interested in learning subjects that have immediate relevance and impact to their job or personal life.
- Are problem-centred rather than content-oriented.
- Are self-directed and like to discover things themselves.

A constructivist approach to education states that learning is an active, contextualized process of constructing knowledge rather than acquiring it (Pass 2004), thus supporting Knowles earlier suggestions (1984). With this thinking, that knowledge is constructed by students based on their personal experiences, our intention was to create relevant learning resources and activities in an online environment that provided opportunities for these experiences as well as allowing them to draw on their own work-place experiences.

Active learning instructional strategies are also a mechanism to engage students. They should be created and used to engage students in thinking critically or creatively, speaking with a partner, in a small group, or with the entire class, expressing ideas through writing, exploring personal attitudes and values, giving and receiving feedback, and reflecting upon the learning process (Prince 2004). The study by Chemosit in Keengwe (2015) explored the relationship between active learning strategies and the skills and attributes that enhance learning among higher education students. The study connected the important role of active learning strategies in the development of skills and attributes that enhance learning and suggested that learning institutions should use these strategies in their curriculum to foster a more enriched experiences for students.

To meet the needs of our student group in the 21st century, we undertook to develop a range of online resources that would encourage students to take part in in-depth learning. In class we can provide students with hands on experience, online we have to create learning through creating opportunities and encouraging students to interact or become involved in the visual/audio content of the courses. The course developers were mindful that emotions are linked to learning (Le Doux, 2000; Goleman, 1995) and wanted the learning resources and activities to grab students' attention and boost their motivation for studying their PM courses. Our work drew on findings of Hendel-Giller (2011, p. 10) in a corporate white paper on the neuroscience of learning, which identifies the need to create a strong enough emotional pull so that the learner wants to engage with the learning content through such things as visuals, stories, novelty and humour. He further suggests there is a need to be mindful of establishing and maintaining the learners' 'mood' when developing the virtual environment.

In addition to the standard use of ebooks and providing a visually appealing and consistent shop front for all the courses, we are working to develop a wide range of online resources using various tools. These resources are intended to engage learners with contemporary project events, examples and situations, delivered either as scenarios, case studies, interactive forums, demonstrations or as a serious game. These are being introduced and supported by related forums, digital material and other interactive tools and techniques (Ispring, Videoscribe, interactive surveys etc).

We looked to incorporate the concepts of games, gamification, and collective analysis tools. Games and collective activities are complex systems for creating meaning and let players inhabit systems in a safe and fun manner, so they are one of the most efficient learning tools. Games generally have the following attributes: goal or objectives; a clear set of rules; immediate feedback; opportunities to fail safely for the purpose of mastery and room to play. The UK Association for Project Managers (APM, 2014, p 9) describes gamification as, "…the use of game design element, game thinking and game mechanics to enhance non-game contexts". Gamification has its origins in the computer game industry but the concept of gamification, its techniques, the use of game thinking and game mechanics in a non-game context are being taken up in other sectors, including education, in order to engage users, solve problems and drive behaviour (APM, 2014, p. 6). The increased availability of technical devices that aid connectivity, such as smartphones and tablets which can support an interactive environment, are a key factor in the growth of these tools. We also sought to create 'conflict' in the online resources and activities. When we use the word 'conflict' we were not creating fights, we were focused on providing learning opportunities designed to make students aware of a discord or an alternative view or different perspectives on situations. For example, one of the video episodes developed for the relocation of the Zoo showed a dispute between team members. In several courses forums topics or video clips show contrasting views or topical issues. This creation of conflict has proved to be an excellent technique to get students involved and works well with this mature and experienced cohort of students.

Being mindful of John Biggs and Catherine Tang's theory (Tang, 2011), which dictates that the learning activities should be meaningful to the student who wants to succeed in them, the aims of this curriculum development in our online MPM courses, are to:
- Engage post graduate students better in their online learning experience;
- Deliver an engaging and digitally enriched curriculum by producing a variety of engaging scenario case studies/demonstrations and gamification activities based on real life examples and problems;
- Support students to be productive professionals by exposing and making them comfortable with digital technology.

On-Line Resource Development

Some of the online resources created for some of our courses, are:

1. Creation of the Video Case Study Scenarios

The concept for the Zoo Relocation case study had been developed for on-campus use for a number of years within the "Principles of Project Management" the first course in the MPM program. What the case study lacked however, was the supporting reality that made it more of an action learning process. The reason for using a project that was not connected to engineering and other more traditional industries where the PM students came from, was to ensure that all students has no preconceptions of the project, none had more superior knowledge than their fellow participant and that took the students out of their 'comfort zone'. The case study provided the structure for the course and followed the life of a particular project, the relocation of a zoo from a city to a rural area as an Open Plan Zoo. It integrated PM theory and processes that aimed to develop the students' understanding of the reality of PM, therefore, being meaningful and relevant for students (Tang 2011).

Figure1: Graphic Created for the Zoo Project

The stages of the zoo relocation were written into 13 video scenarios, creating a world that students became part of, in a way not dissimilar to children absorbed in the world of Harry Potter. The scenarios where an instructional device which provided a working example, thus demonstrating an expert's problem solution for a learner to study (Atkinson, R. K.; et.al.2000) and incorporated the devices of visuals, stories, novelty and humour that Hendel-Giller (2011, p. 10), identified as needed in creating the strong enough emotional pull to motivate the learner to engage with the learning content. Students were positioned to relate to the characters and situations provided in each episode, undertook learning activities using the resources we developed to accompany each week's focus and contribute to activities.

A unique aspect of the development of the learning resources, was the involvement of a diverse team of academic, professional and technical staff who each provided important contributions to the project's success. A lot of effort was taken to make sure the filming and scenes looked realistic. There had to be a gritty real life expose feel to the episodes. The steps taken included:

- Clarification of course content and learning outcomes for each episode based on extensive research and information gathering into Zoos, content analysis of PM methodology and associated documentation. Revision and aligning of existing content.
- Development of script and scenes (locations, clothing, logos, documents etc) (8 editions were produced)
- Briefing notes for actors and clarification of the content for each week with the key issues that needed to come across.
- Filming with professional and volunteers actors (a director was employed to manage to film crew etc.)
- Development of the supporting documents and Project Management Office (scoping Document, Strategic Plan, PMO documents, learning tools and activities)
- Editing and uploading to the learning site.
- Development of forum questions, group exercises; and revision of assessment tasks.

The new digital learning resources have been used for the first time in 2016. The success can be determined via improvements in the overall student course satisfaction ratings. Using a student evaluation survey feedback question 'Overall, I was satisfied with the quality of this course' the following results were provided: Pre the video scenarios the mean value was: First half of 2015: 44.44% and the second half 2015, 50.00%, but after the introduction of the video scenarios in the first half of 2016, the mean was 63.64%. In addition student comments via the MyCourseExperience course evaluation tool, provide further insight as to the success of this curriculum redevelopment as shown in the following comments:

'The Mawson Zoo videos were fantastic. The forum questions were relevant and practical and assisted with learning.'

'I really enjoyed this course and I thought that the format of online delivery was really effective and made it so flexible and easy to learn at my own pace and timetable. I thought that the weekly activities were really good, but I would have preferred if they weren't all assessable every week.'

'The Principles subject with the Mawson Zoo videos is a fantastic introductory subject. The forum exercises were practical and helped to contextualise the coursework in a project context that was very relatable. The effort put into this production was well worth it.'

'Using the "Zoo" as a live example with the video clips made the course very real. I thought the actors were brilliant. Stepping through the various stages of the project and working through exercises as we went helped to consolidate the concepts'

'The weekly film clips were very, very helpful, very professional and helped an enormous amount to put the weekly readings into context.'

'I believe the weekly units covering a project from a real world perspective were of great assistance when comparing them to my own experiences professionally. It made it simple to relate the process to my current role.'

'The weekly video scenarios helped very much to provide context to what would otherwise have been very academic material.'

Evaluation is continuing with the current deliveries of the course.

2. Interactive demonstrations and games – Critical Path Method and others

Online game development can be very expensive, so due to limited funding availability and the skill level of the course developers, we chose to incorporate gamification elements into the demonstration of the key concept of The Critical Path Method, a topic within the course Project Control Method, rather than develop a full on game. This is the first of several demonstrations that will be added in this course and others in the program, where there is a concrete skill that needs to be taught, or where a clear understanding of industry concepts is needed, for example how you calculate Internal Rates of Return, decision analysis and other relevant tasks.

An existing set of slides were transformed with elements of gamification through Articulate Storyline software and a 'commentary' was added to create an interactive learning demonstration. We integrated game mechanics into the content of the demonstration session with students being required to undertake in-session activities using 'drop and drag' technology to solve the problems and discover how to construct a Critical Path for a project and accompanying timeframes. It was hoped that these gamification elements would encourage students to continue through the content because it motivated them (Pandy 2015). This learning was then applied to a real-life project and problem (relevance), thus meeting the needs of both PM students and adult learners (Knowles 1984), with the application to a real world example (Velodrome project). This task was referred back to the application of constructivist learning theory (Pass 2004).

Figure 1: The Critical Path Method – interactive demonstration

This course is being delivered for the first time in the current Study Period, so full evaluation data is not available at this present time. However, there have been positive comments and there appears to be an improvement in those students demonstrating an understanding of the Critical Path Method questions in the forums. More data will be collected to validate the improvement between the before and after student cohorts, once this Study Period is completed. Other online collective activities and games are currently being developed as an interactive resources and teaching tools, to be used for students to work collectively to enter their analysis. One being developed is an investment decision analysis tool that goes through various iterations, group analysis tools such as SWOT analysis and PESTEL Analysis tools.

3. Real Life Contemporary Examples – Executive and Ex-students Interview

To introduce contemporary and real life examples into a number of the courses in the program, a series of three videos conducted at three different work sites with the CEOs of Projectized Organisations discussing the issues around strategic planning and managing their organisation, have been developed. After viewing, students are then challenged to develop new strategies for the organisation for the next few years. In another videoed interview, a past PM student is interviewed on the relevance of what they he studied in this program, to his current job. Another series of videos is being developed which will focus on industry experts providing real life examples of projects.

Figure 3: Contemporary Material and Discussion

RESULTS AND CONCLUSION

These digital learning resources are being used for the first time in 2016. The variety of digital resources and learning tools we are currently developing and will continue to do so, provide active, constructivist learning tasks with elements of gamification. Hopefully they address the three areas of diversity Felder (2005) identified for engineers, as needing to be addressed by curriculum developers to meet student diversity. Applied to our specific MPM student cohort, this includes student learning style – online, asynchronous, range of technical skills, time poor and problem-based learners; approaches to learning – constructivist, active, relevant, and motivational (utilizing emotional elements, gamification, storying, ad visual elements) and the different intellectual levels (AQF 7 and 8 which lead students to check, critique, hypothesise, plan and design and produce (Anderson and Krathwohl 2001, p46). The characteristics of your learners, the type of learning required and its level, will all influence the decisions a course developer makes on which online resources and learning tools can be developed or applied to provide an effective online learning mechanism. Developing different online resources enables us to determine what works in what situation. With limited financial resources, educational developers need to judge what are the most

effective online resources for their client group, given their learning needs, characteristics and academic requirements.

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