Playing with Lego: Constructing modular interactive digital learning resources

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Abstract

The development of innovative digital interactive learning resources to develop academic literacies has been a key driver of the Auckland University of Technology Student Learning Centre. This pilot project derived from both a student and staff identified gap. Thus, the Student Learning Centre decided to support the development of staff lead research that would contribute to the identification, discussion and proposal of new and innovative approaches to support students in this area. This paper outlines a pilot project to create a series of digital, modular and interactive learning resources aimed at developing academic literacies. The presentation of this new idea at a conference will allow a valuable opportunity to collect feedback before the project is implemented.

Introduction

Tertiary student learning centres support and contribute to the development of academic literacies. In an increasing digital world, learning centres need to develop strategies and approaches which acknowledge students' previous experiences, skills and environment, and simultaneously support the development of an essential range of academic skills. While recognizing the existence of a wide range of literature on the impact of digital technology in education, the development of a digital modular suite of resources, which could be combined and shared in different ways seems to bring a zest of innovation. Thus, this paper aims to provide an overview of the Auckland University of Technology (AUT) Student Learning Centre (SLC) pilot project to develop a series of digital interactive learning resources. This approach was developed after wide discussion and consultation with stakeholders, and addresses an essential resource gap, as identified by both students and staff. This project builds on previous SLC research on the development of digital resources (Bassett & Silva, 2014), factors that contribute to student success (McWilliams & Silva, 2014), as well as the importance of embedding and contextualized learning (McWilliams & Allan, 2014). This paper starts by offering a theoretical framework which informs the project. Then it briefly introduces the AUT SLC, followed by an overview of the pilot project. The paper then suggests some conclusions and offers some questions for discussion.

Theoretical framework

One of the key aspects of developing useful digital learning resources is a sound theoretical framework. Building on Shulman's (1986) model of pedagogical content knowledge, Koehler and Mishra (2009) offer a useful reflection framework by identifying three core components in the analysis and development of learning materials, content, pedagogy, and technology. In this framework, content knowledge relates to a specific area of knowledge, which is directly related to a particular subject. This would be the case for engineering, medicine, architecture, or any other subject. Pedagogical knowledge acknowledges the existence of specific pedagogical approaches. As educators, it is essential to reflect on the relationship between content knowledge and pedagogical knowledge, and thus develop effective learning strategies. Living

in the digital age, these strategies are usually developed with the support of digital technology. Although 'technology' has a wider meaning, digital technology has become an inseparable component of the design and implementation of effective learning strategies and materials. Thus, by identifying three different components, content knowledge, pedagogical knowledge, and technological knowledge, Koehler and Mishra (2009) have developed Technological Pedagogical And Content Knowledge, or 'TPACK'.

Tertiary learning centres tend to focus on the development of academic literacies, which support the effective interpretation and communication of information in a specific content area. These are essential skills that students use to meet the requirements of study at tertiary level. These skills not only include the traditional literacies of reading and writing in an academic context, but also address 'multiliteracies' , which acknowledge the need to develop a wider set of skills. Cope and Kalantzis (2009) offer an interesting landscape of these literacies, including written language, oral language, visual representation, audio representation, tactile representation, gestural representation, representation of oneself and, spatial representation. In addition, AUT has identified the need to develop a set of academic literacies, which include language proficiency, information literacy, digital literacy, numeracy, and statistical literacy (AUT, 2012). These skills frame the content knowledge that learning centres develop with students.

The project's pedagogical approach is designed to empower learners by increasing independence and self-awareness, and thus transforming the learning experience. This is clearly related to the concept of 'Heutagogy', which Kenyon and Hase (2010) define as the process where the learner determines what, when and how to learn. Additionally, the project is guided by the concept of microlearning. Hug (2010) argues that microlearning is a cross-over concept, allowing for more flexible and dynamic alternatives to traditional learning and teaching. Furthermore, and still within the pedagogical framework, the project is also anchored in the concept of scaffolding (Bruner, 1974), which is rooted in Vygotsky's zone of proximal development. Thus, this project will also include a level of modelling, while offering support to learners in their journeys.

From a technological perspective, the project is designed to take advantage of Web 2.0 affordances, allowing the creation shared spaces (O'Reilly, 2005), which could also be accessible via mobile devices. Thus, the project will include a virtual space where students can collaborate and co-create. Additionally, it will take advantage of Sharable Content Object Reference Model or 'SCORM' standards. SCORM standards provide flexibility of distribution, and will not only facilitate autonomous constructive learning (Gil, Candelas, & Jara, 2011), but also allow these materials to be shared via Learning Management Systems, such as Blackboard or Moodle, as well as webpages. Interestingly enough, McWilliams and Allan (2014) have argued for the benefits of embedding academic literacies development in the content of teaching programmes. The use of a SCORM standard would allow faculty to use these resources within their own programmes and thus develop the best-practice model proposed by the authors. Finally, SCORM standards also allow the incorporation of microlearning and scaffolding, thus supporting the development of a self-aware student.

AUT Student Learning Centre

The AUT SLC supports the development of students' academic literacies, facilitating the achievement of their full academic potential. Digital technology is a key component of the SLC's work, not only because it is one of the literacies identified by AUT, but also because it

is incorporated in the development of the wider framework of multiliteracies. In recent research, Bassett and Silva (2014) have identified recent SLC digital achievements, and provided recommendations for the development of an SLC digital presence. In their work, they have identified the need to provide: academic literacies content that is engaging; the use of pedagogical approaches that not only acknowledge learners' contexts, but that also offer the development of a practical component; and an approach that facilitates the creation and management of digital learning resources (Bassett & Silva, 2014).

The project

The pilot project is aimed at developing micro, modular, SCORM compliant digital resources, which can be combined in several different ways to support the development of more complex tasks. Microlearning allows students to focus on small tasks, providing an immediate response to their needs. This may contribute to their own learning process, as students determine what, when and how to learn. These small modules would allow for different approaches to learning, and could include a short video, interactive exercises, and access to further resources, while also offering a virtual space for collaboration.

Project phases

Phase one of this pilot project would identify the most common complex tasks for which students most often seek SLC support. These will include, but not be limited t essay writing, report writing, literature reviews, reading strategies, and time management skills. The output for phase one is an initial list of complex tasks.

Phase two analyses each complex task, identifying their core elements. As an example, the complex task 'essay writing' could be composed of: 'understanding the question', 'planning', 'brainstorming', 'researching', 'reading', 'paraphrasing', 'paragraphing', and 'referencing', amongst others. Similarities between core elements in complex tasks could consequently be identified with the possibility of the same core element bring used in constructing different complex tasks. The output of phase two is be a list of core elements.

In phase three, learning materials are to be created to support the development of the core elements identified. This includes a short three to five minute video, an interactive exercise that would provide feedback, references for further readings, and a link to a virtual collaborative space. These elements will be aggregated in a single learning unit using SCORM compiler software. The output is be a series of SCORM compliant learning units.

Phase four uses the SCORM compiler software to synthetize these learning units back into the initial complex tasks. Although providing a useful suggestion of the order in which units should be developed, the navigation allows students to determine which unit, and in which order, they would like to complete the module. The output will be a learning module that combines the different learning units, and which supports students' skills development to accomplish the complex tasks.

In phase five these modules are made available to students in an ePub3 format using Adobe InDesign. This allows open distribution via the web, eBooks, or even – at a future stage – in a mobile app. Additionally, learning modules and learning units could be available in their original SCORM format to lecturers, and could be added to LMS in specific papers. This would contribute to the development of the embedded approach.

Playing with Lego: Constructing modular interactive digital learning resources, New Ideas and Emerging Initiatives

Project assessment

The project will have an ongoing monitoring process by a project steering committee. Although Basset and Silva (2014) already provided some existing data regarding AUT digital student engagement, the project could incorporate both student and lecturer feedback. Additionally, there would be a focus on collecting learning analytics, which could inform further developments, as well as reviews of existing materials.

Project expected outcomes and impact

An increased student exposure to academic literacies development strategies and materials is expected. In turn, this will potentially have an impact on success and completion rates. However, an overall impact assessment framework would need to be developed as a stem project.

Conclusion

This paper provided an overview of a pilot project to be developed by the AUT SLC. The project is driven by a gap identified by both students and staff regarding digital interactive learning resources. Its aims are to develop digital learning units which support the development of academic literacies. These units aim to foster students' independence, and incorporate microlearning and scaffolding pedagogical approaches. Built in SCORM compliant format, units can be combined to create complex learning modules, while also are able to be distributed via different channels. This pilot project builds on wide discussion and research that has been done in the SLC in the last year. Its presentation to a wider conference audience allows a useful brainstorming opportunity which could contribute to the achievement of this project's aims.

Questions to the audience

Tentative discussion areas with the audience include, but are not limited to:

- Overall project feedback
- Feedback on project framework and design
- Feedback on the level of detail in learning units
- Possibilities for intra and inter organization collaboration
- How to collect and incorporate feedback from students and lecturers
- Which virtual space could best be used for learning units, allowing us to take advantage of Web2.0 affordances and social media, while also offering a structured collaborative environment?
- What are the staff implications of maintaining this virtual environment? Would it be student lead, or have staff supervision?
- What framework could be used to measure the project's overall impact?

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