The design and development of an e-guide for a blended mode of delivery in a teacher preparation module

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Abstract

This article reports on one section of a larger study about the implementation of a blended mode of delivery into a Technology teacher preparation module. The article gives details regarding the development and implementation of an electronic study guide (e-guide) for a blended learning module as part of the larger study. The authors describe the need for innovative learning through the intensified implementation and use of electronic media, new technologies and social media in order to enhance teaching and learning in higher education. A design-based approach was followed to develop and implement an e-guide to facilitate a blended mode of delivery, through enhancing online interaction and learning. The article reports on the stages followed in the process and obstacles encountered along the way. The article concludes with recommendations for further research into designing and developing e-guides for blended learning.

Keywords: electronic study guide, blended learning, online interaction, design-based approach

INTRODUCTION AND BACKGROUND

The Faculty[1] of Educational Sciences at North-West University (NWU), Potchefstroom Campus, identified in its strategic priorities the need to intensify the implementation and use of electronic media, new technologies and social media in order to enhance teaching and learning experiences for pre-service teachers attending the faculty (NWU 2011a, 157). Furthermore, NWU follows a broad teaching and learning approach of progressively independent study within a blended teaching and learning environment for all modules within programmes, supported by a variety of interfaces and organised by means of study materials (be they in a printed or electronic format) (NWU 2011b, 4).

Online learning is pervading higher education, compelling educators to confront existing presuppositions about teaching and learning in higher education. Leaders of higher education are challenged to position their institutions to meet the connectivity demands of prospective students as well as their growing expectations and requirements for quality learning experiences. Given the accumulative evidence that Internet information and communication technologies (ICTs) are transforming the world, there is good reason to believe that this will be the defining transformative innovation for teaching and learning in higher education in the 21st century (Akyol, Garison and Ozden 2009, 65; Garrison and Kanuka 2004, 95; Vaughan 2010, 60). In this light, blended learning could well be an option to address the varying needs of the next generation.

LITERATURE REVIEW

A new landscape in education currently exists where physical and virtual environments are blended to support learning in university courses (Stacey and Gerbic 2008, 964), and according to Hadjerrouit (2007, 284), this blended approach is becoming the most prominent delivery mechanism in higher education. Scholars are focusing on a new phenomenon they call 'the next generation learners' who demonstrate fundamental differences in the way they approach knowledge acquisition, problem solving and moving into the workplace. The question to ask, according to Dziuban, Moskal and Hartman (2005, 2), is: 'whether higher education is meeting the needs of the present generation learners'. This question leads to speculation on the need to transform higher education and ways to go about doing so.

Methods of teaching and learning are expanding dramatically, a phenomenon which is marked by the emergence of new ICTs in support of innovative forms of pedagogy (Garrison, Cleveland-Innes and Shing Fung 2010, 31; Hadjerrouit 2007, 284; Vaughan 2010, 60). Consequently, e-learning, online and blended learning are pervasive in higher education nowadays.

Blended learning

Vaughan (2007, 85) defines blended learning as 'the thoughtful fusion of face-to-face and online learning experiences, emphasising the need for redesigning learning and teaching in such a manner that the strengths of each are blended into a unique learning experience'. Dziuban, Hartman and Moskal (2004, 2) refer to blended learning as learning programmes that combine face-to-face classroom instruction with online learning. Alonso, Lopez, Manrique and Vines (2005) add to the above the mixture of event-based activities such as self-paced learning

and live e-learning. In addition to these descriptions, the literature also refers to blended learning as a hybrid format of delivery (Bleed 2001, 18; Reasons, Valadares and Slavkin 2005, 83). Horn and Staker (2012, 3) regard blended learning as a formal education programme in which students learn at least in part through the online delivery of content and instruction with elements of student control over time, place and pace but also at least in part in a brick-and-mortar location (classroom environment).

Guarding against blended learning becoming yet another hybrid, Bleed (2001, 20) warns against blended learning being interpreted as the 'bolting' of technology onto a traditional course, using technology as an add-on to teach a difficult concept or adding supplemental information. Instead, he suggests that blended learning should be viewed as an opportunity to redesign the manner in which courses are developed, scheduled and delivered in higher education through a combination of physical and virtual instruction. NWU (2014) in its teaching and learning strategy defines blended learning as the:

> integration (or fusion) of thoughtfully selected complementary teaching and learning approaches and technologies based on educational merit as determined by factors such as the pedagogical context, the nature of the discipline and the learning material, and the profile of students, so that the strengths of each are blended in a unique learning experience. It is a fundamental redesign that transforms the structure of, and approach to, teaching and learning embedded in a range of delivery modalities.

Irrespective of the diverse definitions of blended learning, those most commonly used recognise some combination of virtual and physical environments (Stacey and Gerbic 2008, 965). Thus, for the purpose of this study, blended learning will mean a combination of face-to-face instruction and online learning, with the implied redesign of courses.

Those tasked with designing and implementing blended learning environments usually have certain purposes in mind, and these purposes differ from one course to the next. Herrington (2006) warns that blended learning is often developed along learning designs that simply replicate a one-way transfer of information from lecturer to student. In contrast, the purpose of the study was to include authentic learning designs, such as the collaborative construction of knowledge, reflection and articulation as well as contextual learning, which offer the opportunity to improve student engagement and educational outcomes. Another important intention during the development of the blended learning module was to add a degree of social interaction, which is important to keep students from feeling isolated in the online environment. The vehicle for achieving the above-mentioned purposes of an online environment within blended learning was the

design and development of an electronic study guide (e-guide) for the successful implementation of blended learning.

Development and implementation of an e-guide

With recent advances in technology, e-guides are becoming an excellent management, learning and assessment tool in the teaching learning process, replacing printed study guides. The purpose of an e-guide is to provide an interactive electronic support mechanism, which will guide students in a structured way to achieve relevant outcomes. For the purposes of the current study, the e-guide was created in order to integrate face-to-face teaching and learning with web-based teaching and other online components to improve teaching and learning in a blended mode of delivery (Academic Support Services 2013, 1).

Hai-Jew (2012) and Montemayor (2002, 475) suggest that students' capabilities in the use of electronic media, the type of software to be used, proper authorisations and accessibility, the inclusion of all information and links needed, as well as a clear explanation on the instructional design of blended learning courses, ought to be considered in the development of an e-guide.

In the study, the following features were manipulated and controlled as part of the design and development of the e-guide (see Figure 1):

• curriculum design (course content): adding and revising course content such as announcements, course information, course documents, links to external resources;

• technology integration: communication and collaboration features such as digital drop box, Facebook, video-ant and other digital recording software;

• teaching and assessment features: Online testing and survey tools.
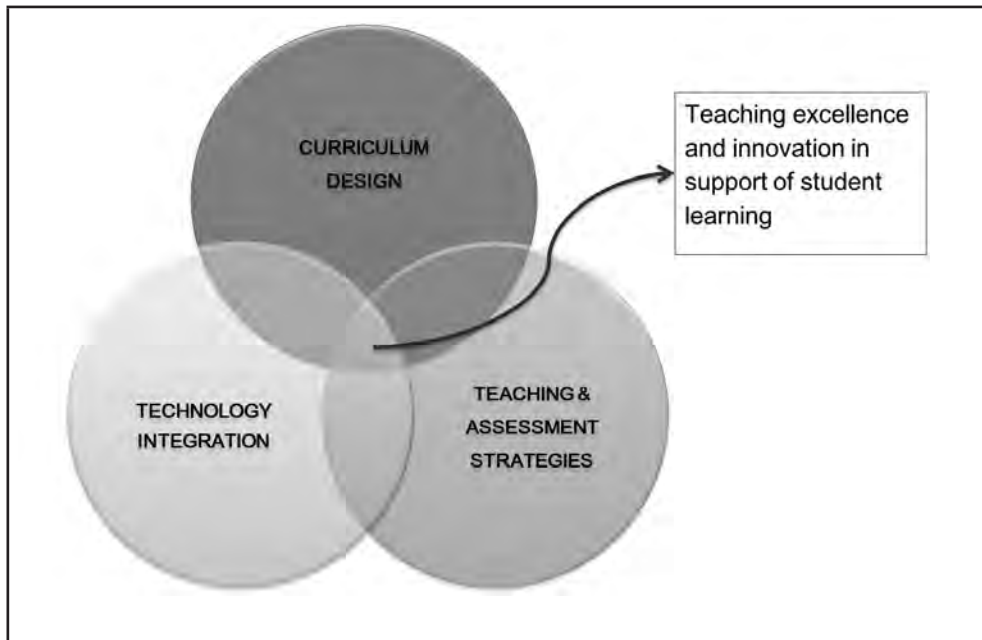
Figure 1: Features that were manipulated and controlled as part of the design and development of the e-guide

A concerted effort was made to ensure that the e-guide would truly support blended learning, and not just be an electronic 'add-on' to the face-to-face contact sessions in the course. It was therefore considered vital to plan and structure the e-guide carefully to attain that goal. During the study, guidelines from Cheung, Lam, Lau and Shim (2010) and the European University Institute (EUI 2009) were used for the instructional design and development of the e-guide. Although the EUI (2009) distinguishes between preparing the lesson materials and performing research and preparing resources, these two steps were combined into a single step in the study. Added to the proposed guidelines was the incorporation of assessment into the design of the e-guide. Figure 2 illustrates the process followed during the design and development of the e-guide for the study.
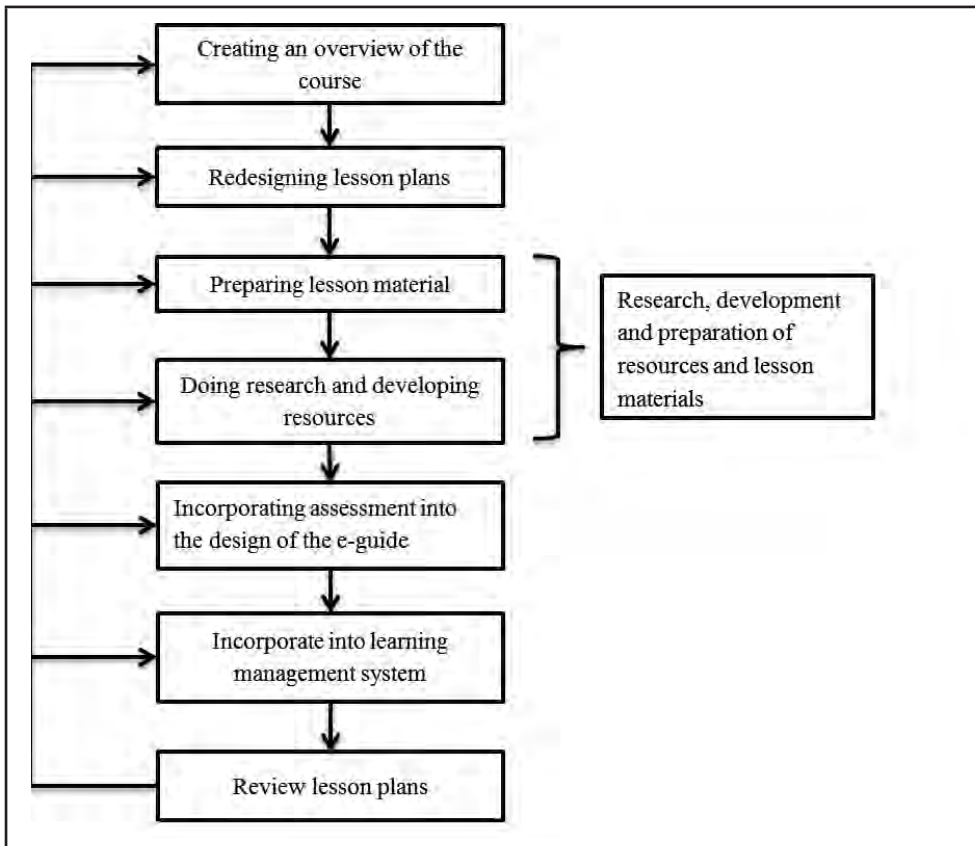
Figure 2: Guidelines for the instructional design of an e-guide

These guidelines, with contextual examples of the design and implementation thereof in the e-guide for the study, are described and have been visually illustrated in the results and conclusion section.

METHODOLOGY

Instructional design is a systematic approach to course development that ensures specific goals are attained. It is an iterative process that requires continuous evaluation and feedback (EUI 2009) and therefore a design-based research approach was followed throughout the re-designing process. Wang and Hannafin (2005, 9) describe design-based research as a 'systematic but flexible methodology aimed at improving educational practices through iterative analysis, design, development and implementation, based on collaboration among researchers and practitioners in real-world settings'.

As illustrated in Figure 3, design-based research is conducted in four iterative phases (Amiel and Reeves 2008, 32; Hadjerrouit 2007, 284). The development and implementation of the e-guide was done within a design-based approach and guided by information specified in the mentioned literature, as described in the subsequent section.
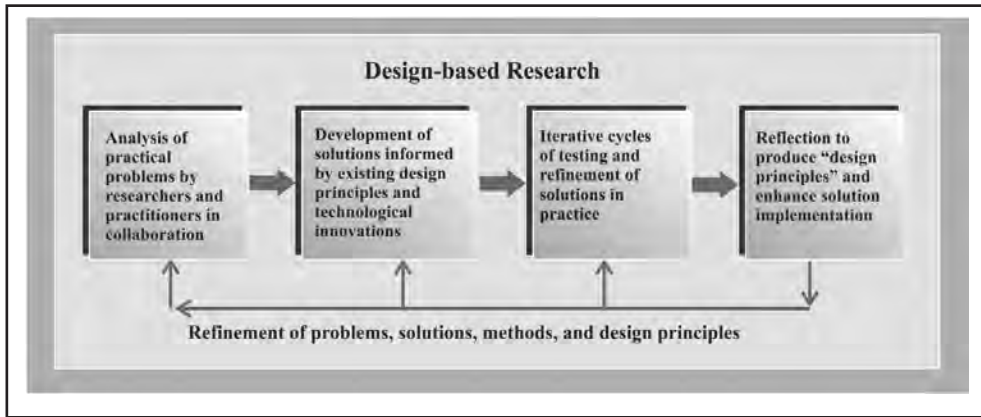
Figure 3: Four phases of design-based research (Amiel and Reeves 2008, 32)

- Design-based research commences with the analysis of the problems and deficiencies of current educational practices; the formulation of research questions; and the review of relevant literature. In an effort to address the strategic priority of the faculty to implement blended learning, the learning environment had to be re-structured to include a larger online component. A deficiency identified in the study was the lack of a vehicle to facilitate the move to blended learning. The development and implementation of an e-guide was contemplated to address this deficiency.

- The development of an e-guide according to the different phases identified from the literature (see Figure 3) to serve as vehicle to help facilitate the move toward blended learning.

- The implementation phase (continuous cycles of testing and refinement of solutions in practice) concerned the implementation of the e-guide.

- The evaluation phase involved the evaluation of the e-guide by means of systematic analysis and critical evaluation of the effectivity of outcomes reached.

RESULTS AND DISCUSSION

The results of the process of designing and developing the e-guide are addressed and discussed according to the different phases (see Figure 3) identified from the

literature (Cheung et al 2010).

Create an overview of the course

The first step in designing the e-guide was to create an overview of the course, to portray the context of the course, as well as to enhance the transition from a face-to-face mode to a blended mode. The facilitator developed an initial plan of the course structure including content, teaching and learning strategies, learning objectives, teaching plans and assessment methods. These aspects were considered and reviewed to ensure the integration of the desired learning goals into the blended learning environment. The purpose of creating an overview of a course is to provide an interactive electronic support mechanism, which will guide students in a structured way to achieve relevant outcomes. Figure 4 illustrates part of the planning documents that were used when the course overview was created. The course overview acted as a foundation for the design of the e-guide for the module in the study.


Figure 4: An example of part of the course overview developed as foundation for the e-guide

Since this was the participants' first exposure to blended learning, it was decided to keep to the norm of structuring the module's learning content around study units within the e-guide. It was hoped that organising the learning content in such a way would provide consistency and a sense of familiarity to students when using the e-guide. The same seven study units, which organised learning content in the original contact module, were included in the e-guide. In support of the blended approach, the online office hours of the module facilitator were placed

prominently on the entry page to the e-guide. Figure 5 illustrates the online office hours and structuring of the learning content in the module into seven study units.
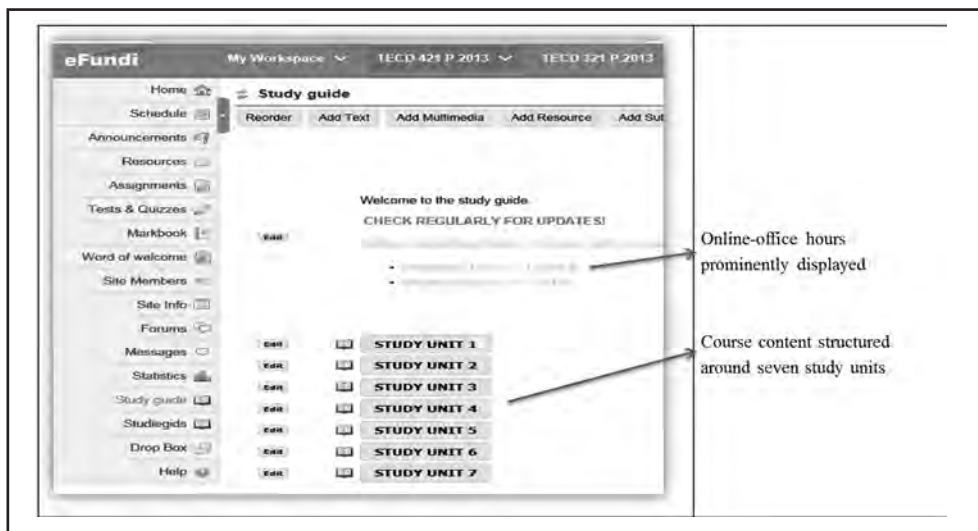
Figure 5: An example of the more detailed re-designed lesson plans. Structuring the e-guide around seven study units, including online office hours

Each study unit was then further unpacked to include specific outcomes for the study unit, as well as the breakdown of the study unit into weeks and periods in each week. Careful consideration of the content and learning aims of each section of work within each study unit in the course overview was utilised to decide which periods would be online interaction, and which ones would be contact sessions. Figure 6 illustrates the unpacking of the content of each study unit into study outcomes, weeks, periods and the mode of delivery.
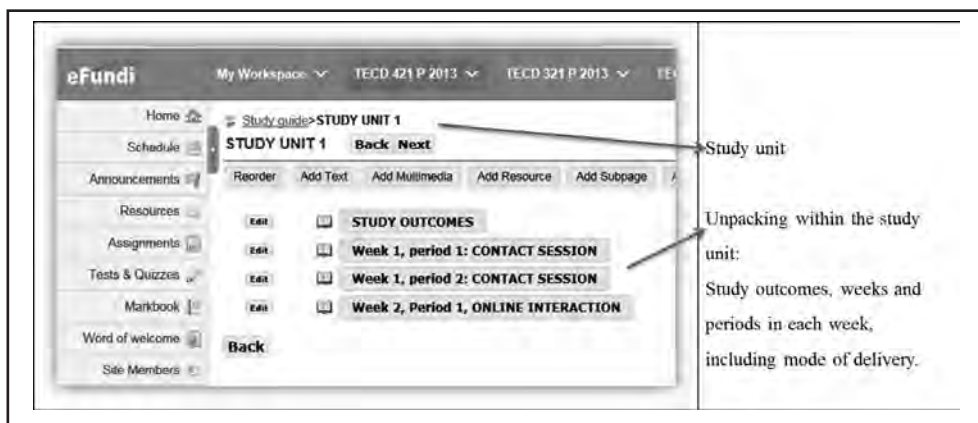
Figure 6: An example of the more detailed re-designed lesson plans Detailed unpacking of study units

This unpacking of the study units involved a careful and detailed re-design of the lesson plans for the course, intentionally to include and to reflect requirements of a blended mode.

Re-design the lesson plan

After preparing the course overview, the lecturer developed a lesson plan to see how online learning could be integrated with face-to-face learning (see Figure 7). The aspects set out in the university's plan for blended learning was used as guide to ensure close adherence to those requirements (NWU 2011a, 4). Specific aspects which were considered included the pedagogical context (learner-centred learning), the nature of the subject Technology Didactics (preparing pre-service teachers with subject knowledge and skills), as well as the profile of the students, which included mixed computer abilities, and disparities in access to the Internet and computers (Reitsma and Koekemoer 2010, iv). All these aspects were considered while keeping in mind the specific aims and goals of blended learning.

Figure 7: An example of part of the re-designing of lessons for the e-guide

More detailed lesson plans followed the initial re-designed plan, which included specifications about what learning activities would occur before, during and after class, indicated for the facilitator as well as for the students. Due to the students' unfamiliarity with the blended learning environment, the lesson plans were detailed enough to state how online learning materials could be utilised maximally to enrich the students' learning experience.

During the redesign of the lesson plan, the facilitator identified changes that had to be implemented and determined how each learning activity would be completed. Figure 8 illustrates the detailed re-design of lesson plans for the

e-guide for the module to include work to be prepared beforehand; work to be completed as part of the session; and a homework or assessment item. Interaction between members of the group was incorporated intentionally into the re-design of the lesson plans.
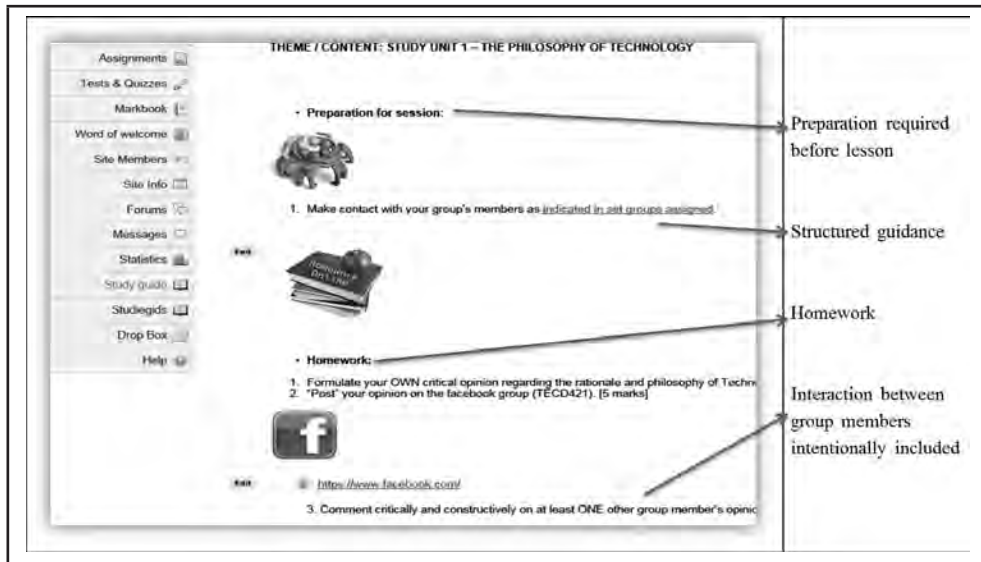
Figure 8: An example of the more detailed re-designed lesson plans

Detailed guidance to support the structure of blended learning, as well as time management, was also included in the details of the re-designed lesson plans. Figure 9 illustrates clearly how structured support has been included to promote blended learning, time management and group interaction. In addition, the example indicates how online learning materials could be utilised to enrich the learning experience of students. It should be noted that meticulous planning went into the design of these lesson plans, including a number of revisions and re-designs, which were incorporated as the e-guide developed.
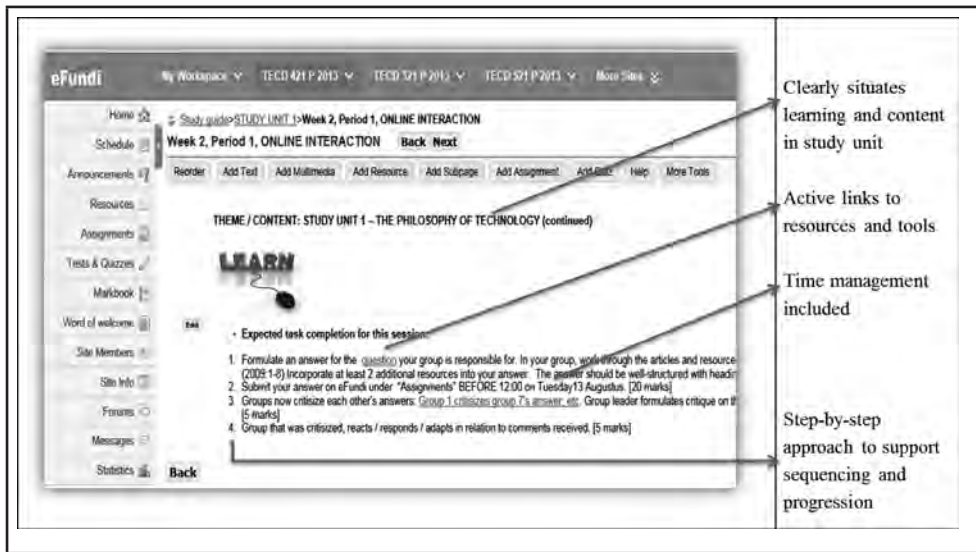
Figure 9: An example of the more detailed re-designed lesson plans to include guidance

Perform research and prepare resources and lesson materials

Although the EUI (2009) distinguishes between preparing the lesson materials and performing research and preparing resources, these two steps were combined into a single step in the study. To help overcome challenges in designing blended learning courses, such as resource constraints mentioned in the literature (Dziuban, Hartman and Moskal 2004, 8), the facilitator researched resources and lesson materials to identify and focus only on those that are both useful and essential in the classroom. Figure 10 illustrates an example of resources that were selected for one of the seven study units in the e-guide. Resources could be accessed online, but could also be downloaded and utilised offline, to enable students with limited Internet access to work offline with those resources. Students were expected to use the resources provided, but also to identify and critically evaluate the suitability of additional resources for the completion of activities. Materials for all the study units were made available via the resources tool in the e-guide to assist students in completing learning activities.
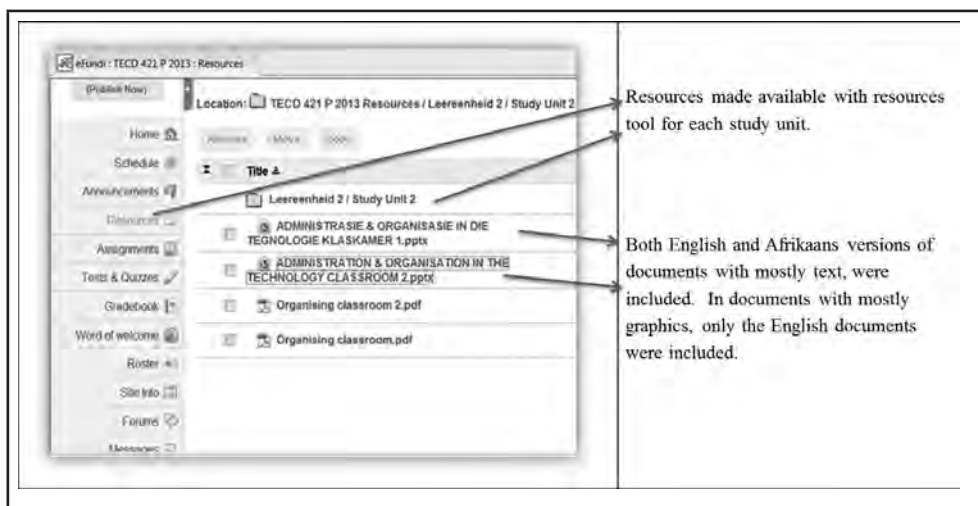
Figure 10: An example of the more detailed re-designed lesson plansAn example of resources that were included in study units

It was considered important that learning activities and lesson materials were a good match; therefore, lesson materials were based on the content, expectations and available resources to extend the students' capabilities. During this research and refinement phase, group activities, assessment questions and discussions were also prepared.

Incorporate assessment into the design of the e-guide

Another important aspect to consider during the design of the e-guide was the incorporation of effective assessments to support learning and the outcomes of the module. Research was conducted and electronic media explored for ways to enable electronic assessment. Additionally, to facilitate group member interaction, peer assessment was selected as the main vehicle for online assessments. It was expected that the inclusion of various opportunities for such assessments would additionally support the development of critical thinking skills. In a further effort to provide guidance and structure in the blended module, the assessment was planned and set out in detail within the lessons of the e-guide.

Since the learning management system (LMS)[2] platform had not yet been developed to support large files at that stage, an alternative platform, available to all students, was sought, and Facebook was selected. The assessment designed as part of the e-guide included structured peer assessment of video recordings of individual member's micro-lessons. Group members assessed one another online, and an opportunity was included for the presenter of each lesson to reflect

upon and comment on remarks which he/she received regarding their micro-lesson. It was anticipated that this would further support interaction between group members, as well as develop critical thinking and evaluation abilities – all qualities that are preferred for teachers. Figure 11 shows an example of such an interaction that resulted from the design of the assessment as part of the e-guide.

Figure 10: An example of how assessment was designed to be incorporated into the e-guide

Care was taken to ensure that each assessment opportunity contributed to the summative assessment for the module (making it 'worth-wile' for the students to complete all the assessments), as well as providing opportunities for formative feedback to support the learning of the students within the module.

Incorporate lesson content into the LMS

The planned and refined lesson content and accompanying resources was packaged and incorporated into the LMS which serves as the learning platform at the university where the study was conducted. Instructional methods for the course were contained within the e-study guide and were loaded on the learning platform, e-Fundi.[3]

To help overcome time-management challenges in blended learning courses mentioned in the literature (Dziuban, Hartman and Moskal 2004, 8), as well as to improve the students' learning experience, the facilitator included the use of various tools available as part of the LMS in the e-guide. These included the Schedule tool, as well as the Announcement tool, which enabled in-time

announcements relevant to the students in the module. Figure 12 includes a section from the announcements made in the module. An example of an in-time announcement can be seen in Figure 12, where the students were given the opportunity to write a class test (or not), and an announcement was made through the LMS about the final decision regarding the test.

Figure 12: A section of announcements included in the design of the e-guide

Announcements were part of the design of the e-guide and additionally included dates for the handing in of assignments and assessment activities, as indicated in Figure 12.

Review the created lessons and materials

The lessons, refinements, assessments and materials designed for the e-guide were reviewed and developed in order to align these aspects with blended learning, as well as with the module outcomes. A tool to view the e-guide from a student's perspective was utilised to gain insight into how students would perceive the guide (Figure 13). Where needed, adjustments were then made to the structure, time schedules, as well as layout of the content within the e-guide. As mentioned in the literature, this review is, however, a continuous process to develop and improve the blended learning module, since context, student profiles and technologies change continually (Cheung et al 2010).

Figure 13: Tool used to view e-guide 'as a student' in order to review the guide design

DESIGN PRINCIPLES FOR DESIGNING AN E-GUIDE

One of the main outputs of educational design research is to produce theoretical insights into a phenomenon, and these are referred to as design principles. Design principles recommend how specific issues could or should be addressed in a range of settings (McKenney and Reeves 2012, 19). In the following section, specific design principles that were identified in the study for the development of an e-guide in the support of a blended mode of delivery are presented. These design principles relate to the features that were identified for manipulation and control as part of the design and development of the e-study guide in Figure 1.

Design principles for *curriculum design* applied in the study:

• developing online learning activities, integrated with face-to-face sessions;

• developing and integrating a set of student interaction protocols such as Facebook and other discussion forums; and

• designing specific tactics for the development of community of inquiry in the course.

Design principles for *teaching and assessment strategies* applied in the study:

• facilitating and directing online discussions to promote online communication;

• managing group work;

• assessing online work; and

• assessing some work online (peer and supervisor assessment).

Design principles for *technology integration* applied in the study:

- using an LMS for delivering course content, announcements, course documents, links to external resources;

- integrating technologies such as digital drop box, Facebook, and digital recording software;

- using online testing and survey tools.

CONCLUSION AND RECOMMENDATIONS FOR FURTHER RESEARCH

In an effort to address the faculty's strategic priority to implement blended learning, the learning environment had to be re-structured to include a larger online component. The vehicle employed to facilitate the move to blended learning was the development of an e-guide. The development and implementation of the e-guide was done within a design-based approach and guided by information specified in the literature.

Though the bulk of the planning, which had to be done at the start of the module, seemed time-consuming, it was probably no more time-consuming than doing sections of planning before each study unit, as was done in the past in the normal contact module.

The lesson builder software has undergone great improvements since the current study was conducted and now offers a larger variety of tools and options to make blended learning even more interactive. The capacity for uploading large files, which was experienced as a problem during the development of the e-guide, might have been addressed sufficiently to render the need for the use of other sites, such as Facebook, obsolete. The choice to use Facebook was, however, decided upon because the students in the course were all familiar with the social network and did not need additional training in the use thereof. The course facilitator was of the opinion that the students' familiarity with Facebook might help to overcome their inexperience with the blended learning approach and enhance a smooth change-over to support student interaction in the online component of the module.

Though various tools were available in the lesson builder used for the development of the e-guide, not all options were used and implemented at once. Since the blended mode of delivery was also new to the course facilitator, she decided to keep it as simple and effective as possible, which is in line with suggestions made in other studies about e-guides. The e-guide definitely supported blended learning through creating an online platform, which supported

connectivity and interaction. The students were exposed to more resources and meaningful online interaction through social media, thereby addressing the strategic priority of the faculty.

As with most research, there is still room for improvement: more tools could be integrated gradually into the e-guide and online interaction could be facilitated through other platforms such as wikis. It would also be prudent to gain more input from students and module facilitators about their experiences with the e-guide and to implement those suggestions where possible in developing future e-guides for blended modules.

Blended learning is not just a part of the future, but is a current reality – it is a world-wide trend with many possible gains. Students will have to be prepared to use e-guides efficiently in order to reap the full learning benefits the blended mode offers them. Facilitators will have to become more adept at developing and implementing e-guides to support blended learning effectively. With reference to the question asked by Dziuban, Moskal and Hartman (2005, 2), the answer is: 'Yes, higher education is aiming to meet the needs of the present generation learners, through making learning more interactive and using online resources. But the process is on-going and the learning curve is steep, with much room for further development.'

NOTES

1   In South Africa, faculty refers to a department within a university or college devoted to a particular branch of knowledge; whereas in the United States, United Kingdom and Canada, faculty refers to the academic staff at a university, college or school (Collins 2003).
2   A learning management system (LMS) helps lecturers to create different types of courses an projects for web-based e-learning, collaboration and research management.
3   E-fundi is a SAKAI-based learning management system for web-based e-learning, collaboration and research management. It is designed to help lecturers and researchers create different types of courses and projects. E-fundi offers a broad spectrum of features including tools for administration, assessment, assignments, communication, sharing resources and collaborative learning.

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