A blended learning approach in higher education: A case study from surveying education

Teaching and Learning Forum 2013

Category: Refereed Research

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The development of a blended learning approach to enhance surveying education is discussed in this paper. The need for such learning strategy is first investigated based on a major review of the Surveying course including analysis of its content, benchmarking with key national/international universities, and various surveys to key stake holders and recent graduates. Appropriate blended learning methods and tools that couple learning theoretical principles and developing technical skills are discussed including using learning management systems, flip teaching, collaborative learning, simulation based e-learning, peer- and self-assessment and e-portfolios. Two blended-learning tools that have been developed for surveying units are presented as examples. The first is an online interactive virtual simulation tool for levelling, one of the key basic tasks in surveying. The second is an e-assessment digital marking, moderation and feedback module. The e-learning and e-assessment tools have been incorporated for three years into several surveying units at Curtin University. Surveys of students showed that the majority of students found the interactive simulation tool useful and contributes to improving their understanding of the computations. Students also found the digital marking rubric helpful in assisting their understanding of practical task requirements, in improving their performance, and in helping them to focus on the objectives of each activity. The paper concludes with a discussion on developing generic skills through authentic learning in surveying education.

Keywords: Blended learning, surveying, assessment, online simulation, marking and moderation

Introduction

Learning is an inherently social process, where different strategies for effective learning can be implemented (Strobl, 2007). The use of new technologies in teaching and learning, e.g. e-learning, can assist in both the enhancement of traditional teaching methods and the development of students' technical skills. At present, there are several e-learning technologies available (Garrison 2011). Many of these address mobility of student learning, which enables students to learn anywhere, anytime and with various devices (Herrington et al. 2012). These include learning management systems providing a virtual platform for students to access teaching resources and interact with teachers, web-based flexible learning environments, and media to encourage collaborative learning among students. In regard to developing technological skills, a wide range of technologies can be used to assist in training students. These can range from videos for demonstration, recording and reflective analysis purpose to simulation-based e-learning (SIMBEL) systems.

The rapid technology change can adversely result in a shift from higher education towards training (Burtch, 2005), i.e. while trying to keep up with the new technology, more focus may be put on skill development rather than on learning theoretical principles. Therefore, a balance of the two components should always be maintained. To face this challenge, a blended learning approach, where learning education combines face to face classroom methods with computer-mediated activities (Strauss, 2012), can be used to combine technology with pedagogical principles for the benefit of student learning (Garrison and Kanuka 2004, Hoic-Bozic *et al*. 2009).

In this paper, a blended teaching approach is presented using surveying education as an example. In addition to classroom learning, it includes online learning and mobile learning. Blended learning that encourages the gaining of knowledge can also be coupled with traditional information-gained skills-development learning (authentic learning). Figure 1 shows an illustration of the components of blended learning and its target outcomes. Blended learning methods have been applied to face current and future challenges in the surveying education field. While focusing on education in surveying, the authors believe that methods outlined by this paper can be useful to other disciplines in applied sciences, such as engineering, agriculture, mining and physical education.

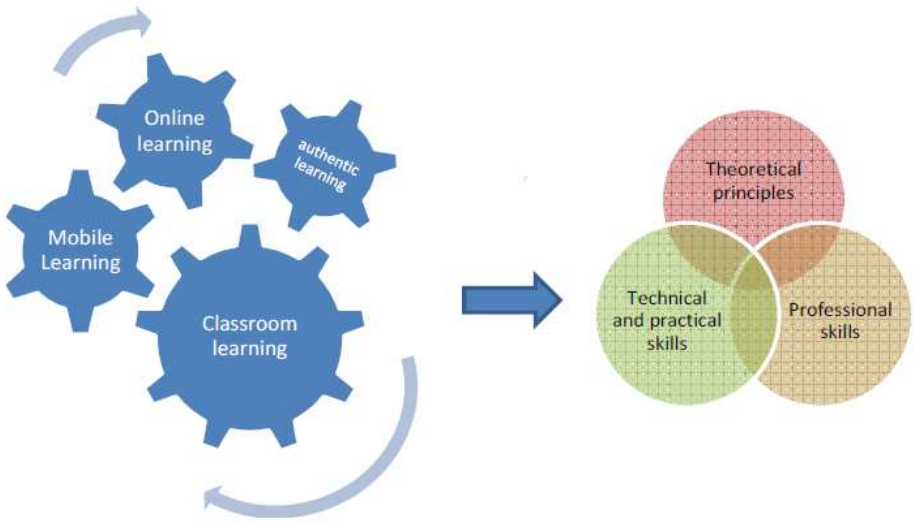

Figure 1: Blended learning methodology

To gauge learning and teaching efficiency, a continuous evaluation of content and use of new technologies in teaching should be regularly performed. While the former has to satisfy the needs of stake holders (e.g. the surveying profession), the latter has to address the problems of teaching a content-rich syllabus with limited resources as found in surveying education. Therefore, the key outcomes and observations of a recent review of the Bachelor of Surveying (BSurv) at Curtin University is presented to show the need for a blended learning approach in addressing rapid technology change in higher education. In addition, examples will be given on efficient inclusion of simulation-based e-learning (SIMBEL) and the use of e-assessment as a marking, moderation and feedback tool. The paper will also provide an example on how authentic learning in surveying is used to develop generic practical skills.

Why a blended learning strategy in surveying education

Surveying is the science of determining three-dimensional positions on or close to the Earth's surface. Education in surveying has to cover a broad range of fundamental topics in mathematics, physics, engineering and law (e.g. Greenfeld, 2011). Apart from a good understanding of theses foundations a surveyor also has to be proficient in the collection, processing, analysing and presentation of spatial data. Traditionally, the use of technology has always played an important part in surveying and therefore surveying education. It is set to play an ever more important part in surveying education in the future given the expanding use of satellite-based measurements, laser scanner devices, etc. In such an environment, students need to have a solid understanding of the theoretical principles underpinning surveying as well as developing the technological skills that rely heavily on authentic practical learning (e.g. work integrated learning). This practical skill development places a very high demand on tutors (e.g. one-to-one training), resources such as survey instruments and finance (e.g. highly specialised and costly instruments). Therefore, surveying teaching and learning strategies have to adopt more suitable methods to both enhance student learning and satisfy the need of the industry and the profession.

In light of continuous changes in technology, teaching methods and required skills of study there is a continuous need for a course to be evaluated in areas such as:

- completeness and appropriateness of content;
- course structure (e.g. topics build up on previous ones);
- skills required (e.g. industry demand);
- teaching and assessment methods (e.g. classroom vs. authentic learning);
- competitiveness with other courses and/or universities (e.g. unique elements).

In Surveying, these aspects have recently been addressed during a major course review of the Bachelor of Surveying (BSurv) offered by the Department of Spatial Sciences at Curtin University, Perth, Australia. While every course review has its own unique aspects to consider, the approach chosen for this review followed six general steps:

1. Analysing existing course (e.g. strengths and weaknesses, content, generic skills).
2. Benchmarking (to similar courses at excellent national/international universities).
3. Survey stake holders (e.g. industry, profession, current and past students).
4. Develop new/changed course (e.g. needs analysis, content required, structure of delivery, teaching and assessment methods applied, generic skills).
5. Feedback and refinement (e.g. ensures key elements have been properly addressed/ implemented).
6. Approval and implementation.

It was concluded that a blended learning strategy was the appropriate approach to achieve the program goals of enhancing the learning process, developing generic and technical skills, and rectifying course structure problems identified. The main points from the review that supported these conclusions were:

- Analysis of the existing course was done internally, involving mostly staff within the Department. Based on past experiences within the course, strength and weaknesses were identified. Key outcomes regarding the teaching aspects identified a good balance between theory and practical exercises together with work placements as a major strength. Weaknesses identified were in part related to inconsistent connection between content but mostly identified a rather low focus on generic skills such as problem solving, communication and project management skills. The latter are recognised as important skills in the 21st century (e.g. Griffin et al., 2012).

- Benchmarking with eight key national/international universities offering similar courses was done in order to assess the current course content and to identify any major deficiencies. This information is important for future strategic decisions such as focusing on market niches and/or addressing shortcomings in content and the distribution of teaching resources to cover content. It was evident from this exercise that the current course structure and content are closely aligned to the surveying courses offered by the eight benchmarking universities chosen.

- Important information was sourced through various surveys to key stake holders such as industry employers, professional organisations and current students and staff at the university. Assisted by the Surveying and Spatial Science Institute (SSSI) a series of Industry Focus Groups were held to discuss the course in general and provide specific feedback on current content, student graduate abilities and future surveying education directions. In addition a tailor-made questionnaire was sent out to all major employers and licensed surveyors in the state. Overall, the outcomes of the Focus Groups and the 51 questionnaire responses agreed that graduates have a knowledge level appropriate to the industries' needs, show great enthusiasm for their work and have a high willingness to learn. On the downside, the Focus Group and surveys identified a lack in some generic skills such as communication, the ability to solve complex problems, a poor perception of professional worth and the *lack of ability to integrate new technologies* into current surveying practice. Interestingly, the same lack of generic skills was identified by the internal assessment of the existing course. Furthermore, the last point demonstrates the need to keep up with recent technology developments.

- Current students and recent graduates were also asked to respond to questionnaires relating to their perception of the course and preparedness for the surveying industry. A key outcome was a confirmation that the inclusion of many practical survey exercises (about 25% of the course has a high level of practical engagement) largely contributed to a high student satisfaction. In other words, students would appear to appreciate authentic or work-integrated learning. Further positive feedback was given in relation to good teaching practice and overall satisfaction. Similar overall feedback can be derived based on Curtin University's online survey system (*eValuate*) that suggests high level of student satisfaction relating to methods of teaching and learning, support learning resources and the staff in terms of quality, attitude, accessibility and responsiveness. Feedback in relation to aspects of improvement related to standards of assessment, unit design structure and expectations.

Based on information and outcomes of the various surveys, a new design for the course was developed. Changes to the existing course, focusing mostly on a blended learning approach such as the improvement on generic skills of new cutting edge surveying technologies (e.g. laser scanning), enhanced skill-development activities, mobile learning, and a balanced distribution of content across units, have been used to further strengthen the authentic learning components of the course. Some of the units within the course have also been redesigned and re-organised in order to allow a scaffolded assessment approach and to blend the practical assessment with formative assessment. This approach was adopted to reinforce development of generic and technical skills as it appears that student satisfaction is closely related to authentic surveying fieldwork tasks. Furthermore, all changes made were scrutinised from a holistic view of the total course to ensure enhancement of student success and satisfaction. In addition, the definition of the new course structure included information and implementation of the Surveying Body of Knowledge (e.g. Greenfeld 2008).

Problems raised by the industry regarding a lack of generic skills have been addressed through curriculum mapping (done in parallel to the course review) that ensured the syllabi of all units was updated and assessments were matched to meet the core University's Graduate Attributes (e.g. generic skills). In this regard curriculum mapping is also important to ensure that sufficient resources and assessments are dedicated towards the development of generic skills and not just focused on the transfer of knowledge. While the latter is always important the former is gaining increased importance as shown by the industry feedback.

The new course structure was discussed with stake holders, and after gaining their satisfaction all necessary changes were made in the implementation phase. This required the provision of all the necessary resources, such as the introduction of a new unit that addresses recent technology development, the update of current survey instrumentation as well as the employment of new staff and the up-skilling of existing teaching staff.

Blended learning methods and tools

Surveying education consists of face-to-face classroom teaching to learn theoretical principles and authentic learning (e.g. practical exercises) to develop technical skills. Both areas of teaching can benefit from e-learning technologies ultimately leading to a blended learning approach in surveying education. This approach can also be used to address the problem of how to *better* engage students in the learning process. This paper considers the blended learning approach to combine the traditional face-to-face classroom teaching methods with e-learning. This in effect means that learning is becoming ever more focussed around the use of the computer and modern communications. While the paper provides specific examples on the use of new technologies in surveying education in the following section, this section will provide some more general considerations that are already partly in place or may become the norm in the future.

Central to e-learning approaches are *learning management systems* (LMS) that administer web-based learning activities (Garrison & Vaughan, 2008). Already common in many higher education institutions LMSs are used to assist in the delivery and management of learning-related material such as course notes, lecture recordings, e-assessments, and discussion forums, etc. Like other web-based technology, the advantage of LMS is their continuous availability from any location given access to the internet. LMS can be used for both the delivery of fully online courses as well as the enhancement of traditional face-to-face classroom teaching.

Commonly based on written material and videos is the concept of *flip teaching*. This approach of blended learning replaces the traditional face to face classroom lectures. It is a form of active learning (Silberman, 1996; Prince, 2004). In flipped teaching, students are provided with learning material (e.g. course notes and videos of lectures) to prepare themselves for the classroom and/or practical activities. Instead of traditional passive teaching in the classroom, teachers can focus more on specific questions and/or problems raised by tutors and students that promote or reinforce the targeted subjects' outcomes. The concept of flip teaching has been trialled trailed successfully in some surveying units (e.g. GPS Surveying). Here students are actively involved in addressing questions, debating and finding solutions to problems that address the desired learning outcomes.

According to the Assessment and Teaching of Twenty-First Century Skills Project (ATC21S, Griffin et al. 2012), *collaborative learning* is an important skill in the 21st century. It directly addresses some of the generic skills such as problem solving, critical thinking and communication. While collaborative learning is not a new concept it recently gained a new dimension with computer-assisted methodologies such as the use of Web 2.0 technology, LMS, and social media. While encouraging teamwork in collaborative learning students benefit from an active exchange of knowledge and ideas as well as having the possibility to monitor one another's work. Today this process is becoming more computer-assisted and so allows collaboration to take place without any face to face contact. This seems to fit the more mobile nature of today's students, where they can fully contribute, at any time and from any location. This now means that social media is becoming of particular importance in facilitating the exchange of user-generated content and online discussions. As surveying exercises typically involve group work activities, collaborative learning is essential in a number of units within the course.

Video technology can be used as an educational tool for the development and documentation of practical skills (e.g. Frehner et al. 2012). Video analysis is commonly used in sports coaching and education, and professional development of teachers (e.g. Rich & Hannafin 2009). In surveying education, video analysis can be used in two ways:

1. for the demonstration of typical practical procedures;
2. the recording of student's practical performance.

By providing authentic-like recordings, instructors do not need to spend significant proportions of their time explaining routine procedures, but can focus more on specific problems. In addition, students can follow the video instructions at their own time and pace. Video recording of students' practical performance can be a powerful tool by allowing self-analysis and reflective practice. Furthermore, video evidence can be taken for assessment purposes. An analysis of emerging video annotation tools is provided by Rich and Hannafin (2009).

Simulation-based e-learning (SIMBEL, Kindley 2002) provides a great potential to develop practical skills in a virtual environment. The student is able to learn practical skills required at a given workplace through simulation via real-world scenarios. SIMBLE also provides the opportunity for students to engage, experiment and reflect. According to Slotte and Herbert (2008) the experimental nature is of great importance in allowing students to study cause-and-effect relationships. In addition, SIMBEL is of great importance for training with fragile and/or expensive instruments or training for work in a hazardous environment. As this is also the case in surveying education, SIMBEL can be an effective tool as shown by one example in the following section. Using SIMBEL, students will be prepared for specific work routines without the need of face-to-face instructions. The saved time can be used by lecturers and tutors to assist students with more specific problems.

In surveying, students typically exercise each practical skill in just one session. As a result, their practical experience is limited to conclusions derived from their own work. One efficient way of improving students' experience is by involving them in *peer assessment* of other group’s work (Falchikov, 2005, 2007). Based on a teacher’s grading scheme (e.g. rubrics), student’s grade their own or one another’s work. While marking, students can learn from their own or other’s mistakes and recognise their own strengths and weaknesses. In addition, teachers or tutors can save time in this grading process as the grading is done simultaneously for the whole group. As demonstrated in the following section, this type of evaluation can be assisted by electronic assessment (e-assessment) technologies that are able to automatically mark and provide feedback (Crisp, 2007). The potential of *peer and self-assessment* to enhance student learning in the surveying fieldwork was investigated over a period of two years in the unit “GPS surveying 382”. According to feedback received from participating students, they found peer assessment to be an efficient active learning tool useful for formative assessment and helped them to address the learning objectives of the fieldwork.

While e-assessments are particularly suited to assess cognitive skills (e.g. memory) the *e-portfolios* can be used to assess practical skills, the main component in surveying education. E-portfolios are becoming more popular in assessing the proficiency of a student on either a particular practical skill or in a general field. This is done by the collection of electronic evidence (e.g. computer assisted) that documents the proficiency. Evidence can be of various types such as written reports, diaries, pictures, audio, video, multimedia, hyperlinks, etc. While being a collection of evidence, an e-portfolio can also help develop communication skills as a result of the assembly of all evidence and presentation of the student’s work.

Examples of simulation based e-learning and e-assessment in surveying

In the adopted blended learning approach in surveying education new teaching methodologies and technologies have been implemented. In this paper, two examples from what has been developed are presented. The first example is related to simulation-based e-learning (SIMBEL) and the second example is e-assessment used as a marking, moderation and feedback tool.

Simulation tool for training students

In practical training of students in surveying, they are required to develop field skills in observation reading, calculations, recording and interpretation of results. To coach and help students to consolidate their knowledge and experience, an online interactive levelling virtual simulation tool was developed (Gulland et al., 2012a). This tool provides helpful formative feedback for students as well as identifying areas where they may need help from a tutor. The feedback is immediate as it is applied within the task itself. This interactive levelling simulation module was designed to address a key basic task in surveying, i.e. levelling. The tool was designed to allow students to practice data entry, fieldwork calculations and checking. Students use the virtual online simulation module to practice self-assessment and rehearse field observations and computations. The interface simulation module is split into three parts. The first part is to practice reading of the levelling staff using the level instrument, the key field observation component. The second part of the interface is the computations associated with the fieldwork observations. The third component is the checking procedures used by surveyors to ensure both the field work and calculations are correct. Figure 2 shows the interface of the “online simulation for levelling” during its use (left side of the figure) and after it has been carried out (right side of the figure). The simulation tool has been tested and used in the basic surveying unit “Plane and Construction Surveying 181”, offered by the Department of Spatial Sciences, Curtin University, as well as other service units in basic surveying.

The anecdotal feedback from students who have used the virtual online simulation tool has been positive in terms of the modules’ usefulness in developing their understanding and ability to carry out the levelling field exercise. In 2011, 42 students studying the unit “Plane & Construction Surveying 181” responded to a questionnaire regarding their experiences using the virtual levelling simulation

Figure 2: Interface of the simulation tool in one example

tool. Students found the interactive simulation tool most useful with comments showing that it was used successfully to practise skills both before and after the field exercise with real-world equipment. The basic questions asked in the questionnaire were:

1. whether the completion of the virtual levelling exercise contributed to allowing students to carry out the field levelling practical more accurately;
2. whether the completion of the virtual levelling exercise contributed to the improvement of their understanding of the computations and checks involved in levelling;
3. the amount of time spent on the interactive tool (< 5 min, 5-15min, 15-30min, and 30-60min).

The responses, given as percentages, by students for each question (out of the total number of participants in the questionnaire) are given in Table 1. The majority of students spent between 5 and 30 minutes using the virtual simulation tool, which is thought to be a reasonable time for students to remain focused and comfortable.

Table 1: Student feedback on the simulation module

Number of participating students	Agree that the tool improves their accuracy	Agree that the tool improves their understanding	Time spent using the simulation module			
			< 5 min	5-15 min	15-30 min	30-60 min
42	90.5%	92.8%	9.5%	40.4%	42.9%	7.2%

Marking, feedback and moderation tool for peer-assessment

The clear definition of the fieldwork tasks and their marking scales associated with different performance levels can help students improve their performance in the practical laboratories. The use of structured grading schemes (for example rubrics) can serve in this regard as well as help in the moderation of marking when assessment is carried out by more than one tutor. At the Department of Spatial Sciences, a marking rubric was developed to provide realistic marking scales and moderated feedback of the assessors for fieldwork activities. The rubrics were designed to be adaptable to multiple surveying units. The templates have been designed for individual and group practicals as well as camp assessments with multiple tasks. They assist markers to be consistent in their marks. The templates were provided to students before commencement of field sessions. This ensures that students know in advance how each fieldwork activity will be assessed, the mark distribution for each task and the required performance level. This helps stimulate or guide the student's efforts in addressing all fieldwork tasks and objectives associated with the practical work.

Four main assessment components were identified for use in the rubrics: fieldwork, field recording, computation and analysis, and presentation of results. The first two components are related to activities performed in the field whereas the last two components are carried out in the office environment, after data collection and verification. These four areas are further broken down into four subcategories that are individually assessed. Each assessment criterion is quantified and varied according to each task/laboratory. The activities for each task have been described and linked to different performance levels that are set to meet the common industry standards for fieldwork execution. A marking scale is linked to each performance category level and the final mark for the assignment is derived from each category level box selected by the marker.

The templates (rubrics) have been incorporated for three years into four surveying units at Curtin University (Plane and Construction Surveying, Engineering Surveying, Mine Surveying and Mapping, and GPS Surveying). Tutors for each of these units use a digital copy of the rubrics. In addition, the marking rubrics were also used by students of the unit “GPS Surveying” over two years to practice peer-assessment. Preparation of the templates in a digital format has served to streamline their use in the calculation of marks and the statistical analysis of results. In addition, the templates are used as a tool to provide specific feedback to students for each fieldwork activity. The assessment outcome is presented in a marking sheet where a calculator tool is applied and assigns marks to each student according to performance of each activity and percentage of student’s contribution. Figure 3 illustrates the calculation sheet component of the rubric. The developed system is designed to provide an accurate, fair and consistent moderation approach that narrows down variability in moderation of fieldwork between different assessors.

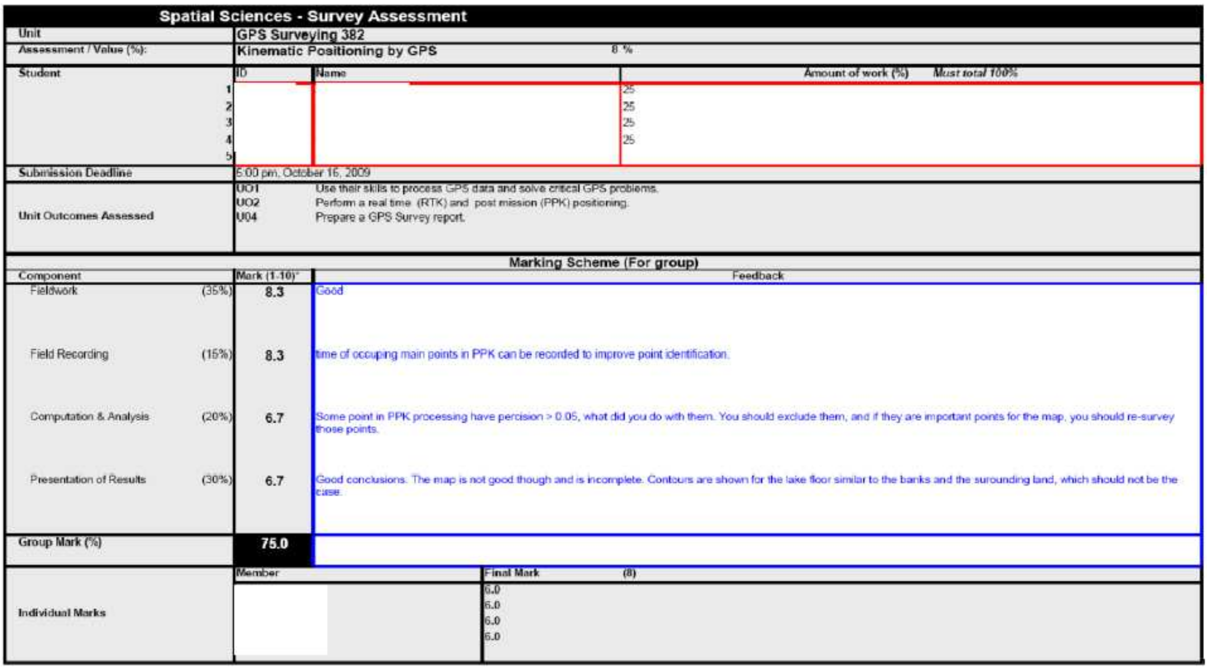

Figure 3: Digital calculator tool and feedback of the rubrics

The testing of the first version of the group assignment marking tool has showed that it provided a very useful tool in helping students to both focus on the objectives of each activity and match effort and achievement to the assigned marks. A survey was conducted with students who had used the marking rubric to obtain feedback regarding its usage and value to their understanding of the practical work requirements. The students’ feedback showed that they found the marking rubric helpful in assisting their understanding of practical task requirements and in improving their performance and response to marking outcomes (Gulland et al., 2012b). In Curtin's University’s online survey system for gathering and reporting student feedback on their learning experiences (*eValuate*) student satisfaction in the surveying area has risen compared to previous years before the implementation of the marking/feedback tool by a factor of 5% on average. The response of the industry received through another questionnaire was encouraging and provided valuable comments and recommendations. These will be taken into consideration in the development of an improved version of the rubrics.

Developing generic skills through authentic learning in surveying

Many generic skills such as those addressed through the course review can be developed and reinforced during practical exercises or through authentic learning. While these skills relate in particular to surveying education they are also present in many other disciplines that have a high proportion of practical exercises. Depending on the units and course structures, such exercises can address both the development of practical skills (e.g. proficiency) and generic skills associated with problem solving, critical thinking and communication. In this section, the paper provides some considerations on the above aspects addressed using common practical exercises in surveying.

Each practical surveying exercise can be defined as a problem that has to be solved. This means that students have to apply their theoretical knowledge in order to apply appropriate practical operations. This process requires problem solving and critical thinking skills (e.g. design practical operation so to ensure an optimal outcome) as well as develop practical surveying skills. Communication skills are also necessary which are developed through the design of tasks that require teamwork as well as the analysis and presentation of final results.

A common practical exercise in surveying typically includes the following tasks:

- Identification of the problem and its required specifications (problem solving skill);
- Design and/or selection of survey methodologies that is able to solve problems in an optimal manner (problem solving and critical thinking skills);
- Performance of practical measurements including appropriate documentation through structured field notes and/or stored electronic data (practical skills and communication skills when performed through team work);
- Processing of all measurements (practical skills);
- Analysis of the processing results. This addresses the identification and removal of errors, the determination of accuracy/reliability to ascertain whether a survey meets required specifications (critical thinking skills);
- Presentation of the survey and its results in a professional and meaningful format suitable for potential clients (communication skills).

In order for students to efficiently perform the above tasks and obtain the needed skills, the lecturers and tutors have to implement innovative teaching approaches that are supported by the blended learning tools discussed in this paper. The lecturers/tutors are consistently required to define challenging surveying exercises that helps students to develop both their practical surveying skills and generic skills. They also need to provide professional guidance during the exercise in areas such as in the use of surveying instruments and surveying methods so as to successfully complete the exercise. This can be further supported by simulating exercises designed to replicate a particular task. Finally, tutors need to provide constructive and timely feedback to students that address the strengths and weakness of their critical thinking and demonstrated skills. This would encourage students to address areas of weakness and allow them to take corrective action to improve future work.

Discussion and conclusions

Facing the challenges of a rapid technology change in higher education, we have shown that a blended learning approach can mitigate some of these challenges. Blended learning will combine traditional classroom learning with online and mobile learning in order to maximise the understanding of theoretical principles, gaining knowledge and development of technical, practical and professional skills. Based on experiences and examples within the Bachelor of Surveying (BSurv) at Curtin University, we believe that blended learning should play a key role in any course review. This is to select the most appropriate methods in teaching and learning to enhance student learning and satisfy the need of industry and profession. Furthermore, some blended learning components such as flip teaching and collaborative learning are well suited to enhance student's active involvement into learning.

Some examples were presented of blended learning in surveying education and information on some key concepts in blended learning. Both provide some insight into blended learning that is likely to become the standard in education in the coming years. In fact many higher education institutions are already in a transition from traditional classroom teaching to some form of blended learning by increasing the use of e-learning and e-assessment components.

Surveying education in particular and education in applied science disciplines in general heavily rely on authentic learning in order to develop generic, technical and practical skills. In this regard we have shown that SIMBEL provides a great potential to develop practical skills in a virtual environment. In cases of shortage of time and resources SIMBEL can provide a high-quality alternative to face-to-face training. We have provided an example on how SIMBEL that was included into surveying education and got an overwhelming agreement from students that the employed tool was helpful to improve their skills and knowledge. Therefore, we believe that SIMBEL should be a key element in any form of authentic learning.

The clear definition of the fieldwork tasks and their marking scales associated with different performance levels in the form of e-assessment templates (e.g. rubrics) can help students improve their performance in the practical labs. The use of a structured grading schemes and moderation of marking is vital to stimulate and guide the student's efforts in addressing all fieldwork tasks and their objectives. Preparation of the templates in a digital format has served to streamline their use in the calculation of marks and the statistical analysis of results. In addition, the templates can be efficiently used as a tool to provide specific feedback to students for each activity.

Acknowledgments

Elizabeth-Kate Gulland is acknowledged for her help in the development of the virtual simulation and marking/feedback tools. The funding received from Curtin University to develop these tools through teaching and learning projects is acknowledged.

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Please cite as: El-Mowafy, A., Kuhn, M. & Snow, T. (2013). A blended learning approach in higher education: A case study from surveying education. In *Design, develop, evaluate: The core of the learning environment. Proceedings of the 22nd Annual Teaching Learning Forum*, 7-8 February 2013. Perth: Murdoch University. http://otl.curtin.edu.au/professional_development/conferences/tlf/tlf2013/refereed/el-mowafy.html