Assessment of Self-Directed Learning by Comprehensive Online Test

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Abstract

Applied Science for Practice 4, is a biological science unit for allied health science students and focused on cardiovascular and respiratory pathophysiology and medications. In addition to lecture, tutorial, PBL and laboratory classes, the unit has got also a Self-Directed Learning (SDL) components consist of weekly tasks printed in the manual with resource information. SDL activities were assessed by manual marking of two selected SDL from all weekly submitted SDL paper works. This project was developed in 2009, for conversion of weekly SDL submission and manual marking to a comprehensive online test. Quizzes were designed aligning with the SDL contents of the unit and placed on the assessment part of the eLearning built-in template scheduled to be held in week 10. Build in assessment part of the Blackboard/eLearning system were used with XP professional operating system and students made familiar with blackboard earlier the commencement of the semester. In the week 13, all students were asked to provide feedback on their perceptions via a questionnaire relating to their SDL experience and the influence of the comprehensive online SDL assessment on their further engagement and learning. Individual responses to the survey questionnaire were voluntary and anonymous. It is concluded that a well designed content aligned comprehensive SDL online quiz can be an effective method of SDL assessment as well as learning.

Key words: self-directed learning (SDL), comprehensive online assessment, students' perceptions and feedbacks.

Introduction

Applied Science for Practice 4 is biological science unit for allied health science students in the school of Arts and Sciences at the North Sydney Campus of the ACU. This unit is in the sequence of 4 along with other biological science units named as Applied Science for Practice 1, 2, 3, 4 and 5. In recent years there has been a significant increase in the number of students in these units and currently the enrolment is ranging from 200-400 students in every year. I am working as Lecturer-in-Charge of Applied Science for Practice 4 (BIOL 229), and this unit is predominantly focused on cardiovascular and respiratory pathophysiology and cardio-respiratory medications. Along with large group lectures and small groups in tutorials, problem-based learning, practical class/labs, it also has a Self-Directed Learning (SDL) component.

The SDL component of the unit is not exactly the same as the topics taught in the lectures, tutorials or problem-based learning classes, but they are further extension of new topics with some link to the taught materials. The self-directed learning materials consist of printed documents containing instructions for completing a topic, followed by several reading sections and the conduct of internet searches relevant to the topic. The SDL activity comprises of weekly brief exercises in the form of short answer questions mostly related to the new topics with search for further knowledge in the relevant field. Weekly SDLs have been designed to promote student centred independent learning in furthering the knowledge of students and leading to the development of lifelong self learning skills. The SDL component is of 12.5% weighting of the total assessment. In the previous semesters before 2009, SDL activities were assessed by manual marking of two selected SDL from all weekly submitted SDL paper works. No doubt some students were seriously engaged with their SDL activities but it was also not unlikely that some others just managed to get their SDL filled in and submitted without being engaged deeply. They might also not have engaged any more with reading/revising their own work for further learning once they had submitted the completed weekly SDL. The process was also associated with the accumulation of huge piles of papers for a very large cohort of students and that requiring manual making.

So, some modifications to the SDL assessment task were made, SDL component still remained as a package of weekly tasks with resource information to promote student centred independent learning. Students were still required to work with all the printed SDL weekly activities in their manual, but instead of submitting the SDL task every week, they were asked to keep their own work, to read/revise their notes and sit in a comprehensive online SDL assessment incorporating all SDLs from week 1 to week 10. It was predicted that with the new system of SDL assessment, the students would be more engaged with SDL activities in their available time as they know it is not just filling in the answers and handing them in to their tutor every week. They need to read/revise and absorb their own work before sitting a comprehensive online SDL assessment scheduled to be held in week 10. So the learners require a further deeper approach engagement with the SDLs, promoting a better concept and retention of knowledge related to SDL content and leading to the development of lifelong learning skills. The other advantages of the new system are a reduction of the huge paper work load for staff and uniformity in marking.

Literature Review

The literature review for this study looked at the facets of self-directed learning along with assessment methods. Knowles described SDL as a process in which learners take the initiative, with or without the help of others, to cater their learning needs and formulate

learning goals. As a result learners have developed skills to have control over the input into their own learning process and accomplish their education goals through their own engaged learning activities (Tough, 1989; Knowles, 1989,2005).

According to Brookfield (1994) self-direction in learning is what when a learner accepting responsibility for learning-related thoughts and actions. Both internal and external aspects of self-direction can be viewed on a continuum. Many adults succeed as self-directed learners when they can take personal responsibility for learning decisions (Hiemstra, 1994). Self-directed learning integrates self-management including management of the context, social setting, resources, and actions. Self-directed learning is a trait that we want students to develop in their mind, rather than wishing them to have and exhibit spontaneously. Academic staffs need to raise awareness of students' role in their own learning and shift some of the responsibility for learning from themselves to the learner (Abdullah, 2001).

Assessments exert a powerful influence on students' learning, leading to the achievement of learning objectives. Quizzes are quick way of gathering information on how well students are meeting their learning objectives. A well designed content aligned quizzes matching with the learning objectives can assesses students' knowledge of the theories, concepts and strategies presented in the course. The results of a well designed quiz also provide an insight on how effectively the learning outcomes have been achieved and feedback on learning and teaching accomplishment of the unit (Davis, 1993). Online assessment in the biological sciences is now being increasingly used applying the principles of good practice in multiple choice item design to ensure that online assessments are rigorous and test the full range of cognitive skills (Harris, et al 2007).

Many Universities and colleges are now increasingly moving to online education as a mode of curriculum delivery and assessments. Some existing face-to-face courses are also combining their classroom teaching supplemented with technology/web-based learning as well as in assessments. Multiple-choice items can be used to measure both simple knowledge and complex concepts. As multiple-choice questions can be answered quickly, it is possible to assess students' mastery of many topics on an hour test. The other advantage of using MCQs with online mode is automated marking (Davis, 1993; Arnow & Barshay, 1999). A study by Redding (2000) showed that an online group is successful at cognitive learning as measured by the end of course examinations. The results of the study also provided strong support for the conclusion that online instruction /delivery, assessment methods are also effective.

Methods

In the recent years, there has been a substantial increase in student numbers in the biological science units. SDL assessment with weekly submitted paper work that require manual making by different tutors was often associated with many hours work particularly in large cohort. Since the introduction of the web-based educational system, online quizzes have played a successful role in the assessment and learning. It is indeed important to explore how student are doing on comprehensive online assessment in the SDL component with automatic marking, as a replacement for paper work submission and manual marking.

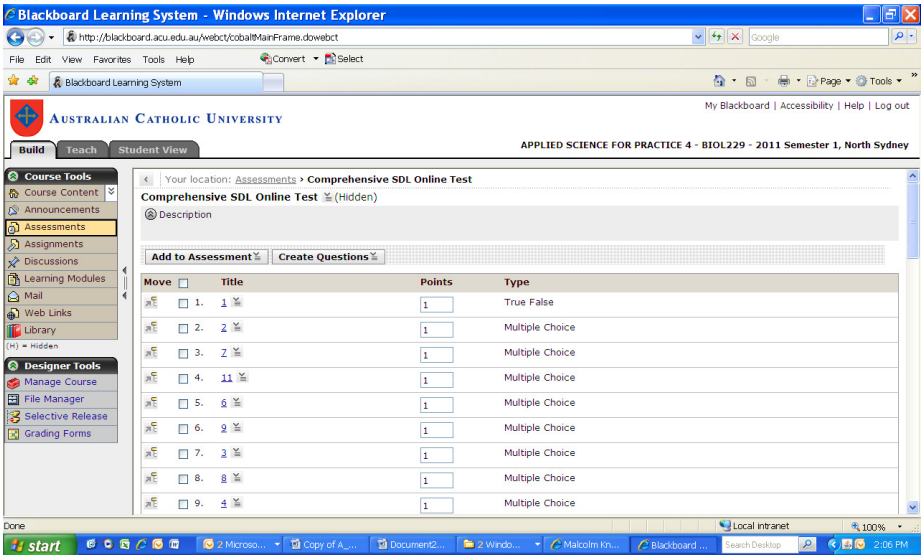

Figure 1. *Blackboard/eLearning system computer screen for SDL online test*

This research project was basically aimed at the development of online quizzes that aligned with all SDL tasks to formulate a comprehensive online assessment of all SDL activities. The other objectives of the project were to evaluate the impact of the new comprehensive SDL online test in promoting students' deep approach engagement leading to an increase in students' achievement and retention of knowledge related to SDL topics. And also to look at whether the new system of SDL assessment could help in reducing students' stress relating to time framed weekly SDL submission. Lastly to compare SDL results in the new system with the other areas of formative assessments of the unit.

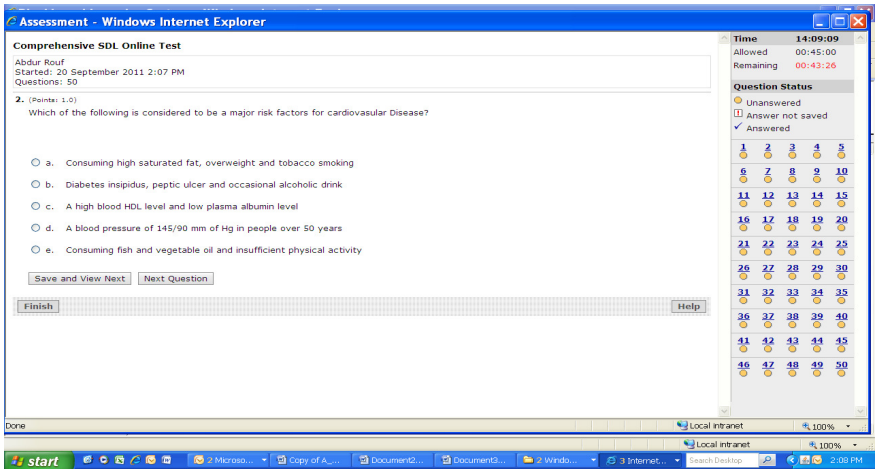

Figure 2. *Blackboard/eLearning system computer screen showing MCQ*

As a supplementary to face to face learning, Blackboard/eLearning system are in use here in ACU to provide lecture outlines and tutorials, PBL as well practical answers. Build in template of the blackboared /eLearning are used (Figure 1and 2) with XP professional operating system and students made familiar with blackboard earlier the commencement of the semester.

The most typical form of online assessment is the multiple-choice, true-false, fill-in-the-gap styles. These items can be used to test the full range of cognitive abilities, from lower order content knowledge to higher order synthesis skills (Harris, Krause, Gleeson, Peat,

Taylor & Garnett, 2007). Comprehensive online quizzes were designed aligning with the contents of all SDL topics of the unit and were placed on the assessment part of eLearning built-in template. The online test was scheduled on Friday, in week 10 of a 13- week semester. Meticulous attention were put to make the test balanced, to cover most of the main ideas and important concepts in proportion to what students learned in their SDL. All the quizzes were marked automatically and the scores of the SDL assessment were kept confidential, but only the learner received his or her score. The scores of the SDL online test were stored in a database and were analysed with no connection to an individual learner. The scores of two other formative assessment tasks of the same group of students in the unit were also stored in database and compared with the SDL scores.

Students' perceptions/feedback were collected by anonymous responses to a questionnaire relating to their self-directed learning experience and the influence of the comprehensive online SDL assessment on their further engagement and learning. The questionnaires in a single page printed paper were distributed to all the enrolled BIOL 229 students in week 12. The students were advised to return the completed survey questionnaire form at the reception desk of North Sydney ACU Campus. Individual responses were voluntary and anonymous as there was no name or student ID on the questionnaire documents. The students' responses/ perceptions about their SDL engagement and the effects of comprehensive online test were analysed and interpreted. The SDL online quiz scores were also compared with the students' performance in two other assessments of the unit. This research project used non-identifiable students' results from existing records and non-identifiable students' responses to the survey questionnaire.

Results

A total of 178 students enrolled in the Applied Science for practice 4, at North Sydney campus were included in the study. They were from wide a range of educational and cultural background with a mixture of local and international students. 163 of them were female and 15 were male having age ranges of 18-45 years. The survey questionnaires in a single page printed paper were distributed to all enrolled biological science (BIOL 229) students in the semester. Completed survey questionnaire forms were returned in a box at the reception desk of North Sydney ACU campus. A total of 141 (83%) completed survey questionnaire forms were received.

95% of the respondents agreed that "reading and revising their own work helped students' to develop better concept and retention of knowledge" related to SDL content of the unit. And more than 91% participants agreed that preparing for comprehensive online SDL test promoted their deeper engagement with the SDL content. About 94% of respondents believed that the new system of comprehensive SDL online test provided them flexibility to work with SDL at their convenient time and a further 86% agreed that the new system of SDL assessment reduced their stress related to meeting the time frame for weekly submission.

More than 91% respondents also agreed that SDL online quizzes were aligned with the expected SDL related learning outcomes and quick results provided them with enough time to diagnose their own learning needs. Students took initiative to improve the concept of SDL by using resources as well as help from peers and teachers. Around 94 % learners agreed that they used the provided resources and took help/assistance from peers (89%) and teachers (76%). And lastly, more than 94 percent of respondents strongly supported that SDL component of the unit contributed their development as a self-directed learner.

Comparison of students' results with two other assessment tasks of the unit revealed consistent patterns of students' performance (Figure 3). The comprehensive SDL online test was out 50 marks having 12.5% weighting towards final the grade. The mean score of the online SDL test was 88.34 ± 6%. This score is very close to another similar assessment task with the same weighting which had a mean score of 88.68 ± 5.17%. (ANOVA- P 0.0001)Another formative assessment of the unit was a class test of 25% weighting in Week 4 and that had a little lower mean score of 72.60 ± 7 %, (ANOVA- P 0.023). This lower mean score might be related to the slightly different pattern of paper & pencil in class test which include some short answer questions (about 35%) along with multiple choice questions.

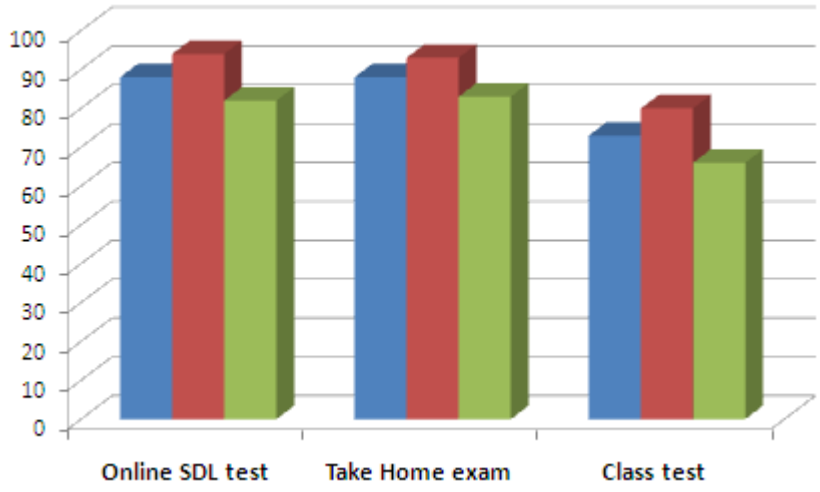

Figure 3. *Comparison of SDL results with two other formative assessments*

Discussion

This study demonstrated that students are capable of performing well in self-directed topics and they believed that SDL component contributed their development as a self–directed learner. A vast majority (> 91%) of the respondents believed that by reading and revising their own SDL contributed to their deeper engagement, better concept and retention of knowledge related to SDL content.

A substantial percent of participants used the resources and took help from peers and teachers. They agreed and were satisfied that the comprehensive online test was content aligned and provided them with greater and flexible time to be engaged with SDL and reduced the stress related to time framed weekly submission. A vast majority of respondents also expressed satisfaction with quick results that provided them with enough time to diagnose their learning needs. Comparing these results with other formative assessments of the unit revealed almost consistent achievements in ones of similar weighting (12.5%) assessment and little lower mean score in the class test having 25% weighting to the final grade. This lower mean score in the class test may be related to the slightly different pattern of class test which include some short answer questions (about 35%) along with multiple choice questions and the first formative assessment.

Over the last decade, there has been a substantial increase in international and local students in the Australian Universities and the higher education institutes are now accommodating burgeoning class sizes. In recent years, the uses of online quizzes for assessment of fully online course as well as in face-to-face unit have become quite popular due to pressures of increasing class sizes (Dalziel, 2000; Peat and Franklin, 2002; Pain and

Heron, 2003; Kibble, 2007). Parallel to the conventional assessment, Web based online quiz has got several advantages. The main advantage of online quiz systems are wide coverage of the course content containing MCQs, true/false, fill in the gap along with some questions that stimulate critical thinking and automated marking (Arnow and Barshay, 1999). To develop good quality online quiz aligned with the course content and learning outcome takes considerable time (DeSouza, 2003), but saved in marking particularly when dealing with a very large cohort. Self-directed learning contributes a strong emphasis on the learners to take the responsibility for own learning and time management skill. A Well organised content specific comprehensive online quiz might be a replacement for paper work based assessment of the SDL contents.

Further research is recommended in connection to this study, such as considering the incorporation of some additional questions with appropriate ethics approval to see selective responses in relation to age, gender, study habits, local / international students, and educational/cultural background and to discover if there is any difference in perceptions of SDL mode among these groups.

Conclusion

The summary of data obtained from a large cohort of biological science student respondents reflected that self-directed learning could be as effective as other standard forms of traditional learning. But students group perceived that completing material in the self-directed mode required more flexible time for deeper engagement to achieve a better understanding of concepts. Reading/revising their own SDL work while preparing for the comprehensive online SDL test helped students to improve and accommodated further engagement with resources, peers/teacher that helped in the retention of SDL related knowledge. Lastly and importantly, this research provided key information that the SDL component of the unit contributed to the development of students as self-directed learners and a well designed content aligned comprehensive SDL online quiz can be an effective method of assessment as well as learning.

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