Sweetening a bitter pill: Educational strategies supporting the foundation sciences in first year nursing

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Abstract

The biological and physical sciences are an important component of the University of Southern Queensland's (USQ) Bachelor of Nursing (Pre-Registration) program. However, science courses within this curriculum have been traditionally problematic due to the fact that many nursing students perceive the course to be difficult due to lack of background science. The use of various educational strategies such as online quizzes, multimedia, and recorded lectures using Tablet PC have been utilised in the development of a foundation biophysical sciences course in nursing. This nuts and bolts session details these strategies and highlights the impact they have had on student learning. The session will provide the opportunity for participants to share similar experiences; particularly looking at ways in which improvements in first year courses have led to potential benefits in student retention and progression as well as enhanced knowledge and reduced anxiety in relation to application of knowledge in subsequent courses within a program of study.

Background

The University of Southern Queensland's (USQ) Department of Nursing and Midwifery recently implemented a revised curriculum for the Bachelor of Nursing (Pre-Registration) programme. The changes proposed centre particularly on re-emphasising the clinical component of this program to allow students to concentrate on practical experience opportunities when undertaking them. Clinical courses are now 'stand-alone' courses in terms of their timing and assessment, but they retain the quality features of the USQ program, which includes application of a sound theoretical base of knowledge. One consequence of this change, among many, involved the development of a new course NSC1500 Biophysical Sciences in Nursing which comprises four distinct disciplines, namely physics, chemistry, biochemistry and microbiology/immunology.

Nursing students perceive biological and physical sciences to be a difficult subject and typically have a low opinion of their abilities in science (Caon and Treagust 1993; Thornton 1997; Jordan *et al.*, 1999). An evaluation of NSC1500 students performed prior to their commencement revealed a number of issues common to literature findings: 40% of respondents felt they were not confident in studying science while 20% felt they were not at all prepared for the course (n=56). An obvious disparity in science background exists amongst this cohort and for a large majority this course is regarded as quite difficult and can be somewhat of a 'bitter pill to swallow'. NSC1500 is an introductory first year course and a

positive student experience in this course can set the scene for success in subsequent years. It lays the foundation for many nursing science and nursing courses, therefore, improvements in this course were targeted at reducing anxiety in relation to science study with the aim of improving the learning experience for these students.

Development and implementation

The primary role of Biophysical Sciences in Nursing is to provide a sound basic understanding of science concepts**.** Therefore, due to its largely introductory nature, the aim of the course is to increase student confidence and motivation regarding study of biophysical sciences and to build a good science foundation for other nursing studies.

The course material was developed using the Integrated Content Environment (ICE) which is a word-processor based system that allows authors to work individually or collaboratively on material for the Web, CD or print. This provides information in an accessible format that is easily navigated by students with little experience of computers. A list of selected readings and navigation to various web sites were embedded in the course material using ICE to aid in the further understanding of the content. In addition to this, a number of new teaching and learning strategies were adopted for the first offering of the course as outlined below.

- *Tablet PC:* Tablet PC technology was utilised in the delivery of lectures in the chemistry and biochemistry modules. Tablet PCs are a pen based input device which enables the presenter to explain and interpret PowerPoint presentations of lectures with hand written annotation. The annotated lectures were recorded live with Camtasia software which captures and records PowerPoint presentations from within PowerPoint. The result of screen video capture means that anything displayed on the computer screen is recorded and can be viewed as a video later.
- *Demonstration in tutorials:* Tutorials were ran weekly and consisted of a variety of case studies and practical demonstrations using video flex to project the images to a screen.
- *Video clips*: The incorporation of practical demonstrations as short video clips to supplement the tutorial session demonstrations was one of the main ways that important theory and practical concepts were delivered in the course. These videos were embedded in the course materials using ICE and also provided during face-to-face lectures.
- *Quizzes*: These were made available online throughout the semester which enabled self-testing of the course material and provided instant feedback.

Impact and student response

The impact that the various teaching and learning strategies had on student learning will be discussed in the “Nuts and Bolts” session. This will be based on student surveys and data on student academic outcomes. The following points briefly outline the main outcomes and will be further expanded during the session:

- ICE was initially developed at USQ to produce content for online and print delivery. It was used in this situation to enhance the delivery and flexibility of the course to on campus students across two campuses. Students have commented on the thoroughness of the resource and the fact that all the materials could be accessed in one location.

- The use of Tablet PC in combination with screen recordings proved very powerful in science instruction. The use of this technology was in response to enhancing the science learning experience of nursing students and to act as a 'leveller' for students who have no prior science background. Open-ended questions have revealed that students are better able to grasp abstract ideals such as atom structure and the formation of compounds by drawing electron dot structures as a examples. The ability to annotate and draw allowed further explanation of key concepts thus giving more sufficient time to the application to real clinical situations, a problem which has been central to this course.
- Although students no longer participated in hands-on practical activities the restructured tutorials augmented student learning of the theoretical aspects with many students commenting on the usefulness of the tutorials. In previous science-based courses, nursing students participated in laboratory exercises, some of which required a high degree of practical science competence with many students seeing them as irrelevant and inappropriate.

Future directions

The nursing student cohort are typically characterised by diverse academic backgrounds and interests in science. Whilst it appears that this does not affect student performance directly, it can have a negative impact with respect to high workload. Anecdotal evidence has shown that there is a close relationship between previous science study and level of workload required to adapt to an unfamiliar discipline. One way to achieve a suitable standard in these disciplines while not overloading is to establish a base knowledge required before starting the course (McKee 2002).

A pre-study package that assists students prior to and throughout their enrolment in this course will be developed in semester 2, 2009. This will also be outlined in the "Nuts and Bolts" discussion and specific comments on the production of this pre-study resource will be invited. The ensuing discussion will provide a valuable opportunity to share with colleagues and to seek comment on this project.

References

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