The nursification of a bioscience unit and its impact on student satisfaction and learning in an undergraduate nursing degree

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ABSTRACT

Undergraduate nursing students traditionally find bioscience difficult, which can be compounded by an inability to relate bioscience theory to nursing practice. Subsequently, many registered nurses feel they lack knowledge in this area. Several studies have identified this problem and focused on the importance of linking bioscience theory in undergraduate nursing curricula to clinical practice. The aim of this study was to assess whether nursification (the active association of a subject with nursing theory and practice) of the bioscience content of a first year, first semester unit impacts on the students' learning experience. The study compared two student groups' perceptions of their learning experience; one group enrolled before the bioscience unit was linked to nursing practice (pre-nursification) and the other group enrolled after the content was linked to nursing practice (post-nursification). Retrospective, quantitative analysis of the mean scores of the student feedback surveys found no significant difference between the pre and post-nursification responses with respect to the students' overall satisfaction of the unit or their ability to achieve their learning objectives, however the students in the post-nursification group reported significantly higher mean scores with respect to their motivation and inspiration to learn, and to learn effectively. The findings in this study suggest that integration of nursing practice within a bioscience unit can improve the learning experience of undergraduate nursing students.

1. Introduction

There is generally no requirement for nursing students to demonstrate previous competency in the biological sciences to meet enrolment criteria (Taylor et al., 2015), therefore a lack of background knowledge in this area has been found to be a problem for students who are confronted with scientific terminology and concepts for the first time. Although many studies have shown that students understand that bioscience is a fundamental component of nursing, its relevance to nursing may not be sufficiently explained to them (Jordan et al., 1999; Thornton, 1997). In a study by Craft et al. (2016), 82% ($n = 22$) of recently registered nurses surveyed agreed that if bioscience lecturers had related the content more to clinical practice this would have assisted their understanding. It is evident that the bioscience content of the undergraduate curriculum needs to be integrated with nursing practice in order for the students to be prepared and confident for practice (Christensen et al., 2015), however bioscience lecturers in nursing courses are commonly not registered nurses but hold science qualifications, with bioscience units shared with other disciplines or Schools (Clifton and McKillup, 2016; Craft et al., 2013; Logan and Angel, 2014). This lack of practical nursing experience of educators has

obvious implications, in particular a reduced ability to link theory to nursing practice. On the other hand, nurse lecturers may lack sufficient knowledge to connect bioscience with nursing (Courtenay, 1991; Friedel and Treagust, 2005). This is important, as in a study by Davis (2010), 40.5% ($n = 42$) of the registered nurses surveyed stated that bioscience in the nursing programme did not prepare them adequately for registration. This was supported by McVicar et al. (2010) who found that nurses viewed their bioscience knowledge as inadequate, Clancy et al. (2000) who reported a lack of confidence in registered nurses' ability to explain the biological basis of certain disease-related signs and symptoms, and Craft et al. (2016) who found that only 54.5% ($n = 22$) of newly registered nurses were confident in explaining the biological basis of nursing decisions.

The question of who should teach bioscience to nursing students has been examined. Some nurse educators do not perceive bioscience as a nursing subject (Davies et al., 2000), perhaps due to their own lack of bioscience knowledge. It has therefore been suggested that in order for students to understand the relevance of bioscience, nurse educators should have a sound knowledge base in this area (Casey, 1996; Evans et al., 2013). The view that nurses should teach bioscience in the nursing curriculum appears to be supported by registered nurses. In a large

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Australian study, Ralph et al. (2017) asked registered nurses who they thought should teach bioscience, and the majority of them preferred that it should be taught by nurses. On the other hand, Larcombe and Dick (2003) and Christensen et al. (2015) suggest that bioscience should be co-taught by bioscientists and nurses, with Larcombe and Dick (2003) providing practical examples of this collaboration in the form of laboratory worksheets. More recently, extensive illustrative examples of delivery have been outlined in the Biosciences Quality Assurance Framework for the purpose of enhancing the learning of biosciences in pre-registration curricula (Taylor et al., 2016). The aim of this study is to assess how the integration of bioscience and nursing (nursification) of a first year, first semester bioscience unit impacts the students' learning experience. The term nursification was mentioned in 2008 by Stojanovic to describe the introduction of nursing culture into midwifery, however the term was not defined. In the context of this current study, the authors define nursification as the active association of a subject, in this case bioscience, with nursing theory and practice. Conduct of the study was approved by the University Human Ethics Research Committee (Approval number 2016/047).

2. Method

2.1. Setting

This retrospective quantitative study compares two student groups' perceptions of their learning experience of a first year, first semester bioscience unit within an Australian university's Bachelor of Nursing pre-registration course. The unit consisted of the following topics: chemical nature of matter and living things; water, electrolytes, and acid-base balance; biologically important macromolecules; cell structure, organisation, growth and death; tissue types; homeostasis and hormonal function; anatomical terminology; microbiology; and the central nervous system. The laboratory classes were held in a dedicated science laboratory in which the students conducted experiments such as pH testing and enzyme reactions, and included activities such as organ dissection.

The unit consisted of 12 h lecture time and 24 h compulsory laboratory time, with students expected to spend a total of 50 h studying the unit over the semester, inclusive of assessments. The unit coordinator, who also tutored sessions in the unit, assured the consistency of content taught in the laboratory sessions by the use of other sessional tutors familiar with teaching the unit over previous years, tutor lesson plans to be adhered to in each laboratory, frequent team meetings and by conducting teaching reviews. The ratio of tutors to students was 1:20.

2.2. The Unit Coordinator

The unit coordinator is a registered nurse with a first-class honours degree in Biomedical Science and a PhD in Molecular Biology. As the first author is the unit coordinator and also the lecturer in this study, the single title 'unit coordinator" has been used throughout the text for consistency. The unit was delivered in consecutive years by the same unit coordinator to two groups of students; one group ($N = 196$) enrolled before the content was linked to nursing practice (pre-nursification), the other group ($N = 232$) enrolled when the content was linked to nursing practice (post-nursification). The students in both groups were informed verbally and in writing that the unit coordinator had both a nursing and bioscience background. The content taught and the learning outcomes of the unit for both groups were the same.

2.3. Nursification

In the first year of the study the unit was conventionally delivered, while the content in the consecutive year was 'nursified' where the content was related to material covered in accompanying nursing

Table 1
Median and interquartile age ranges of the two groups of students enrolled in the bioscience unit in consecutive years.

Quartile range	Pre-nursification	Post-nursification
Q1	19	20
Median	22	24
Q3	32	33

theory and practice units. Nursification involved linking the bioscience content with clinical and real-life situations in the form of narratives, nursing relevance, and the ability to communicate effectively with patients, carers and the health care team. For example, whilst teaching the topic of electrolytes, the students in the pre-nursification group were asked to list electrolytes and describe their function, whereas the students in the post-nursification group, although similarly assessed, the questions were set effectively within the context of nursing, and promoted the application of theory to the understanding of nursing practice. For instance, the students were asked to answer the question "Excuse me Nurse, what are electrolytes and why do I need them?"

2.4. Population

The number of students enrolled in the pre-nursification unit was 196 (183 female, 13 male), and in the post-nursification unit, 232 (219 female, 13 male). Age distribution between the two years was very similar (Table 1) and ranged from school leavers to seniors; the age range was 18–69 pre-nursification and 17–57 post-nursification. One student in both years was aged above 55 years. At the end of the semester student numbers had decreased by 10 and 9 respectively. The students had no direct clinical practice experience during the semester.

2.5. Data Collection

Unit surveys and Teaching surveys were sent online to all enrolled students at the end of the semester. The surveys were completed voluntarily and anonymously. Students responded to each statement using a university generated 6-point Likert scale with the categories Strongly Disagree, Disagree, Slightly Disagree, Slightly Agree, Agree and Strongly Agree, where 1 indicates Strongly Disagree and 6 Strongly Agree. The mean scores were generated by the university. Retrospective responses to four evaluation statements from the student feedback surveys were analysed. The two statements from the Unit survey were: *Activities in this unit helped me achieve the learning objectives*, and *Overall I was satisfied with the quality of this unit*; and the two from the Teaching survey were: *The Unit Coordinator motivates and inspires me to learn* and *The Unit Coordinator helps me to learn effectively*. As the feedback was given anonymously at the end of the semester, the responses did not have any effect on the student-unit coordinator relationship. Furthermore, as this is a retrospective study, the unit coordinator was not aware at the time of the unit delivery that the scores would be analysed, thereby avoiding influence.

2.6. Statistical Analysis

Continuous pre and post-nursification mean score data generated from the four evaluation statements were compared using independent sample t-tests. Data was analysed using the statistical computer software Usable Stats (2016). All p levels lower than 0.05 were considered statistically significant.

3. Results

An independent sample t-test was used to compare the average scores reported by participants in the pre-nursification group with the