‘Preparing for sciences’ workshop:
A new initiative for Whyalla nursing students

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Abstract: This article describes a regional campus initiative, which set out to address the problem of high student failure in first-year Human Bioscience courses in the Bachelor of Nursing program. Through the introduction of the ‘Preparing for Sciences’ workshop provided at the beginning of the semester, the faculty of the Discipline of Nursing and Rural Health at the Whyalla Campus developed students’ understanding of the learning process and individual learning, related scientific concepts to the practice of nursing, and began examining specific scientific topics relating to the human body as a way of preparing students for the study of sciences. Evaluating the learning that transpired and the impact of the workshop on academic performance was considered essential. Results of the post-workshop survey indicate that the students (n=22) who participated in the pilot workshop perceived it as a valuable introduction to studying sciences and university life in general, while results of the end-of-course survey (n=6), constrained by small sample size, found the workshop to have been useful in preparing students for Human Bioscience 1, positively impacting on their performance in this course. The initiative is worthwhile continuing on a regular basis.

Keywords: science education, nursing program, student failure rate and attrition

Introduction
It has been observed for some years that many nursing students fail to complete science courses on their first attempt. The branches of science dealing with structures, functions and disease processes of the body and management of conditions appear to be stumbling blocks for students, perhaps owing to the difference in ways of learning. Learning science courses can be difficult (Strube, Thalluri and Kokkin, 2004). Enormous information must be remembered. There is the problem of deciding which information is a must-know as against which is nice to know. Reading science literature is cumbersome because the terms are foreign, the style formal and presentation technical. Students who fail their sciences are delayed in their academic progress and may even decide to leave the program altogether. Illeg (1998), cited in Zeegers and Martin (2001), stresses the costly repercussions of student failure rates at university, estimating a $360 million per annum loss on the tertiary system.

Our University has organised campus and program specific systems and processes, which help students succeed in their studies. Some of these include: orientation activities (now called ‘First Connection’) to introduce new students to library facilities and the University’s online environment; the employment of Learning Connection advisers and study skills advisers who work very closely with students to enhance
their academic skills; and maximal use of information technology by making learning resources available on-line and introducing discussion pages. Another worthy approach is the use of printed materials, for instance, a beginner's book (Strategies for success in nursing studies, Kokkinn and Calabretto, 2004), which guides students in meeting the requirements of courses in the nursing program.

Our team at the Discipline of Nursing and Rural Health, Whyalla Campus, has also introduced a number of initiatives to help students' transition to university life and achieve success in science courses. We adopted problem-based learning (PBL) in teaching nursing and science courses. This teaching method underscores learning from real-life events by interacting and reacting to the elements posed by real-life issues. Another strategy is the introduction of a student-driven peer-mentoring program. Senior students, who act as mentors, support new students (Penman, Oliver and White 2004). The preparatory science workshop is another activity that has been introduced. Held before students commence the nursing program, the preparatory workshop aims to give new students a head start. This introductory program, based on the concept of learning to learn, has a lasting positive effect on student learning approaches (Zeegers and Martin, 2001).

The objectives of this paper are fourfold: to describe the preparatory science workshop delivered at the Whyalla campus; to report the evaluation of the pilot workshop conducted; to examine the impact on students' academic performance in Human Biosciences 1; and, to explore ways by which the workshop might be improved to better assist students in their science studies.

Background

Tertiary students are confronted with many challenges during their first year. In referring to the work of McInnis, James and McNaught (1995) who studied the first year experience of students in Australian universities, Zeegers and Martin (2001, p. 35) cite that ‘30% of the first-year students they surveyed had seriously considered terminating their studies during first semester’. A study in the United States estimated that 60% of students at public institutions fail to complete degrees within 5 years (Twigg, 2004). The same author similarly observes that the first year of college is crucial to success and completion of a degree.

The difficulties experienced by Australian and American students resulting in discontinuing their enrolment include: ‘curriculum overload, perception of poor teaching, loss of interest in the area of study and inadequate advice on academic problems’ (Zeegers, 1994 and Seymour and Hewitt, 1994 in Zeegers and Martin, 2001, p. 36). The most noteworthy revelation from these studies is that ‘… commencing students are generally poorly prepared for the tertiary experience and may not be willing to persist when they encounter difficulties’ (Zeegers and Martin, 2001, p. 36).

The factors responsible for students’ academic success are many and complex. Some of these include demographics, style of learning, prior experience, assessment, teaching and learning activities, campus climate, organisation constructs, physiological attributes, financial constraints (Kevern, Ricketts and Webb, 1999; Zeegers 2004). Zeegers (2004), in using various instruments to evaluate student learning to explore academic achievement, concludes that the most significant factor is prior academic performance. Other significant variables are learning approaches and proficiency in the English language. The personality factor conscientiousness is also related to achievement.

Many of these factors are not amenable to intervention, hence, attention is given to those interventions educators and tertiary institutions may implement to assist in learning and academic achievement. Biggs (1991) pinpoints the levels of attack, namely, the student, the teacher and the institution.
Research into student approaches to learning has uncovered that ‘learning is essentially content driven and thus we would expect learning to vary according to the requirements of different disciplines’ (Zeegers, 2001 p. 116). Variations in student learning approaches have been found; for example, science students engage in deep memorising strategies (Prosser and Trigwell, 1999 in Zeegers, 2001). It appears that successful students employ strategies that best correspond to the undertaking. Moreover, of the three approaches to learning, i.e. surface, achieving and deep (Biggs, 1991), the ‘achieving approach appears to undergo the greatest change with time, while the deep approach showed a consistent positive correlation with assessment outcomes’ (Zeegers, 2001, p. 115).

New teaching and learning activities must be implemented. The traditional lectures are failing us because they are not engaging students (Twigg, 2004). Academics need to promote active learning, which involves students actively processing ideas being taught, cooperative learning, team work, use of existing knowledge and linking to new knowledge (Fuller, 1998). Fuller (1998, p. 3) summarises effective teaching fittingly when he says ‘… effective teaching is more about the learner than the teacher, and more about the learning activities than presentation methods’. In order to make this happen, however, academics need education on contemporary teaching and learning practice.

Tertiary institutions will need to appraise their emphasis and intent. No longer are universities the ‘keeper of the keys’, but, rather, viewed as a ‘service industry’ (Zeegers and Klinger, 2003, p. 631). Universities must push for the use of strategies that engage students in a meaningful way. The learning process is as important as the content. Tertiary institutions must promote and value basic skills, such as communication, numeracy, information technology and learning how to learn (Dearing, 1997).

The workshop

Introductory letters were sent to all first-year nursing students encouraging them to enrol in the program. The five-day workshop, entitled ‘Preparing for Sciences’, was offered to both on- and off-campus students. In particular, new students, who did not have any science background or who had been away from school for many years, were urged to attend. The workshop aimed to provide a broad overview of science; introduce students to biological and health sciences that were most important to nursing; provide students with a beginning understanding of scientific concepts, principles, and definitions; and show also that science can be practical, relevant and fun. Integrated in the workshop was a segment on the learning process and successful learning approaches.

The workshop started off with a general welcome and introductions. Student mentors joined the class to give short talks about their academic experiences and encourage the newcomers to participate in the mentoring program. It was acknowledged that beginning students were likely to experience a variety of difficulties and might be confused and overwhelmed (Doring, Bingham and Bramwell-Vial, 1998). New students were assured that these anxieties were normal and would dissipate with time.

Next on the schedule was biological and medical terminology. Students were showed how to understand medical terms. A presentation on becoming a scholar followed. The need to develop literacy skills and scholarly writing in nursing was highlighted. Some hands-on web-based learning transpired and good study skills and habits were reinforced during this time.

Moreover, the basis of students’ fear and dislike about science was discussed briefly. The role of media in stereotyping science as being difficult and beyond comprehension was mentioned (Mallow, 1986). The images and myths conjured up by people caused concern amongst students. At this point, participants were taught about the learning process and various learning approaches. The charge given to students was to focus on their individual learning styles.
During the next three days, students were introduced to biology, chemistry and physics. Discussion began by viewing the human body as a whole and understanding the physiological processes needed for the whole body to function. Specific topics on cells, homeostasis, metabolism, biochemistry, organic compounds, fluids, electrolytes, acid-base balance, pressure, heat and measurements were explained and linked to the human body and the study of nursing. The methods of teaching employed were lecture, tutorial, discussion and reflection. Students were also engaged in other productive learning activities such as problem-based learning and student interaction. The practical sessions provided opportunities for group work, communication, and cooperation. The final task was to do a small research project on an assigned topic and present this to the group. This was an opportunity to teach peers, the best way to learn, according to Biggs (1991).

Evaluating the workshop

Evaluation of the workshop was conducted in two stages. During the first stage, called the ‘post-workshop stage’, evaluation was conducted immediately after the workshop. The second stage was the ‘post-course stage’, where evaluation was conducted at the end of the course Human Bioscience 1, offered during the first semester.

For the first stage, a Likert-type survey was used. A seven-item structured instrument was developed to gather students’ perception and satisfaction with the workshop. The questionnaire collected data on how students perceived the learning experience (Question 1), organisation of the workshop (Question 2), information presented (Question 3), contribution to personal and professional growth (Question 4), appropriateness of speakers (Question 5), and benefit to other students (Question 6). Student satisfaction for each of these criteria was quantitatively measured using a Likert scale from ‘strongly disagree’ to ‘strongly agree’. Item 7 sought students’ suggestions for improvement of future workshops.

For the second stage, a seven-item structured questionnaire was distributed to participants via the post. The questionnaire surveyed students’ opinions concerning the usefulness and effectiveness of the workshop. Question 1 sought to find out whether the workshop was helpful in preparing students for the course Human Bioscience 1. Question 2 sought students’ opinions concerning the helpfulness of the workshop in assisting settling in the university. Question 3 queried how the science workshop helped prepare students for the course while question 4 required students to report their final grades in Human Biosciences 1. The particular strategy or strategies used by students in studying science was asked in question 5. How the workshop might benefit other students was probed in question 6. Question 7 required the students to suggest changes or improvements in the workshop content and/or format.

A brief letter accompanied the questionnaires explaining the purpose of the survey. The letter assured the students that participation in the survey was voluntary and confidential. Completing the questionnaire was taken as consenting to participate in the study.

Results of evaluation

There were 28 students who participated in the first science workshop held at Whyalla. Of the 28 post-workshop questionnaires distributed, 22 were completed and returned, which was equivalent to 79% response rate. Results were extremely positive. The majority of students ‘agreed’ or ‘strongly agreed’ that the workshop was a pleasant learning experience, well-organised, and supportive of personal and professional growth. They found that the information provided was relevant, interesting and current and the speakers appropriate. The students were unanimous that other students would benefit from participating in the workshop.
There were a variety of responses in item 7 where suggestions for improvement were called. Many found the content to be overwhelming and suggested lengthening the workshop for another week or sending materials early for students to pre-read. A good number of participants requested further simplification of the subject matter. A few did not appreciate the assignment they were required to do. Overall, the workshop was a success, considering these gratifying comments:

… overall it has prepared me for what I am in for over the coming years.

(The facilitator) was a pleasure to study under, superlative effort! I learnt a lot, and learnt what areas I will need to spend more time on.

… As the time went on I found I settled down and I have benefitted from this workshop. (The facilitator) was a very enthusiastic speaker. I enjoyed listening to her.

… I have a good basic knowledge now of how much work I need to do and how to go about it.

… On the whole I have gained a tremendous amount and think this is a really valuable experience for external students to experience the classroom. Networking was great.

Of the 28 end-of-the-course questionnaires that were mailed to students, only 6 were completed and returned. Post-course evaluation showed that these students had all passed their first-semester science; two students obtained a high distinction, two credit and two pass 1. Five (5) students found the science workshop helpful in preparing them for Human Biosciences 1. All 6 reported that the workshop was helpful in assisting them to settle in the university. Five (5) reported that the science workshop contributed to their success in the course. The majority of the students surveyed used particular strategies in studying science, i.e. pre-reading of topics before lectures, doing revision questions, rewriting lecture notes, having a regular study partner and joining a study group. All 6 recommended the workshop to future students believing that it would benefit them. The suggestions for improvement were very similar to those initially reported.

Exactly how did the workshop benefit the students? There were a number of ways the workshop assisted students. The following responses were obtained:

Gave me an insight to how Uni worked, what was expected of me and prepared me for the lecturers etc which would otherwise have been a shock.

Introduction to aspects of course. Although there is no presumed knowledge for Bioscience it was good to gain some insight, it also helped to begin to think in that manner. I feel the first lecture would have been daunting if not for the workshop.

By revising information that I had learnt in year 12.

Gave me an insight into the Bioscience course – which gave me the confidence to enrol into the course.

By doing an overall summary of body systems, by clarifying how the names of medical conditions can be simplified.
Discussion

As higher education is made more accessible to the wider population, students participating in it will be more heterogeneous. With this trend in higher education, Zeegers and Martin (2001) warn that there is the subsequent increase in failure rates and attrition. Our University’s broad selection processes have resulted in a widely diverse student population (Ramsay et al., 1996). Whyalla nursing students are a heterogeneous mix of recent school leavers, non-recent school leavers, mature-aged students, students who come from Indigenous or culturally and linguistically diverse backgrounds, enrolled nurses, and students pursuing nursing as a second career. Our students come to us with varying life experiences, maturity, information literacy skills, and degrees of preparation for university experience and for sciences in particular.

This development obviously necessitates different and creative strategies to address the heterogeneity of the student population. Depending on students’ prior educational exposure, they may experience varying degrees of difficulty with the transition to university. This may require the implementation of strategies targeting the needs of sub-groups within the student population in order to give them the best chance of academic success. At our University, academics are continually challenged to pursue innovative, satisfying and productive learning and teaching activities that will assist students to achieve academic success.

The idea of providing generalist study skills programs is not new, nor is the provision of bridging courses to assist non-traditional students. This science workshop had the features of both. The workshop was successful in providing new students with an overview of university life and what is entailed in learning science. Students appreciated being told early about demands of study and the amount and comprehension of the material required for the course. They valued knowing about successful learning strategies they might apply when studying and this improved their self-confidence. Students realised that tertiary study is not merely an extension of secondary study requiring finer skills and know-how. Students got used to the idea of constantly being challenged with new information and activities.

Academics, on the other hand, realised that transition to tertiary studies involved a developmental process and students needed guiding through this process to develop as independent self-directed learners (Doring, Bingham & Bramwell-Vial, 1998). They were also aware that they needed to be sensitive, dynamic and engaging. The facilitators allotted time to increase awareness about the broad range of learning strategies available to students. They could not stress enough the need for a consistent, steady approach to study, accentuated with thorough understanding, wide reading, discussing and reflecting (Biggs, 1991). This is the deep approach, which yields academic success.

Students were taught how to learn the scientific concepts by reading, conferring, reflecting, mapping (Nowak and Gowan 1984), problem-solving and peer-teaching. The essence in learning is what the student does rather than what the teacher does (Shuell, 1986 in Biggs 1991). Practical exercises were conducted for the purpose of reinforcing knowledge about the topic. These were very popular with students because they were actively participating, interacting, teaching each other and clarifying their understanding of the topic.

It was unfortunate that only 6 students responded to the second survey. All passed the course well. However, a generalisation as to the influence of participating in the workshop on the final grade was difficult to make because of the low response. We need to be aware of the possibility of sample bias. Zeegers (2001) reports that students who respond to follow-up surveys are smarter and motivated in comparison with those who do not respond. Thus, results should be interpreted with caution. The extremely low response to the second survey necessitates future workshop evaluations before valid
conclusions can be made. Nevertheless, some valuable lessons were learnt which will better inform academics when planning for future workshops.

**Future directions**

The suggestions volunteered by students during the first and second evaluation stages will be given serious consideration, e.g., a library visit, pre-readings, academic writing. The negative feelings about sciences will be addressed by providing steps to overcome these perceptions, stressing how universal and practical science really is, and continually linking sciences to the study of nursing. Also, the number of science topics will be reduced so that students are not overpowered. The approach will be simpler and more interactive. More emphasis will be given on the learning process. In addition, the following subtopics will be incorporated in the next workshop: scientific reasoning, student motivation, identifying and building skills, computer technology, and support systems. The workshop will be redesigned to include: many small group activities, computer-based learning, self-assessments, and feedback and reinforcement of course concepts.

**Conclusion**

We reported on the conduct of a workshop designed to assist nursing students in studying sciences. We discussed the workshop and its evaluation comprehensively so that other learning institutions may learn and/or reproduce it. This initiative will continue to be implemented on an annual basis at our campus.

Results of the evaluations, constrained by the low number of responses, revealed that the participants benefited. Participating in the workshop provided knowledge and information. It provided students with tools and strategies for learning. It gave an overview of the course and a direction as to how to proceed to complete the course. Furthermore, the workshop provided insights as to the demands of the course. For at least one student, it was an opportunity to revise and affirm knowledge. The workshop assisted participants in the positive transition to university and increased their confidence, determination and efficacy. Evaluations of succeeding workshops will be undertaken to allow us to arrive at valid conclusions regarding its impact on grade. Efforts to continually improve this activity will be made.

The benefits of the information derived from the workshop are many. The evaluation will inform academics of the significance of preparatory programs in providing support to incoming nursing students. It will direct us to develop new schemes and maximise utilisation of available resources to better assist students in their studies. This workshop is one way of improving student retention and avoiding nurse training wastage.

**References**


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