Student Success
ISSN: 2205-0795
Volume 7, Issue 1, pp. 37-48
March 2016

Bridging the gap to first year health science: Early engagement enhances student satisfaction and success

Jyothi Thalluri
University of South Australia, Adelaide, Australia

Abstract

Student academic success and positive satisfaction in first year health sciences programs is shaped by their transition experience. An introduction to core knowledge, study skills, and engagement with staff and students has historically been overlooked, but this has been newly recognised as a contributor to first year success, especially with mass higher education of students from diverse backgrounds. The University of South Australia 'Preparing for Health Sciences' workshop was designed to assist the student transition into health science programs. The workshop improved confidence and enthusiasm in starting university (56% pre- and 95% post-workshop), and 97% considered the workshop effective overall. Introduction to biological principles was widely considered to be beneficial (87%). The attrition rate after the first semester in 2014 was 7.6%, which is appreciably lower than the standard 12% in science-based courses. These findings demonstrate that an introductory workshop does greatly assist in the transition of students into their health science programs.

Please cite this article as:

Thalluri, J. (2016). Bridging the gap to first year health science: Early engagement enhances student satisfaction and success. *Student Success, 7*(1), 37-48. doi: 10.5204/ssj.v7i1.305

This article has been peer reviewed and accepted for publication in *Student Success.* Please see the Editorial Policies under the 'About' section of the Journal website for further information.

Student Success: ***A journal exploring the experiences of students in tertiary education***

Introduction

The move from elite to mass higher education has been accompanied by concerns around the globe that many students are not well prepared to cope with the transition to university education, be it on-campus or distance education (Lowe & Cook, 2003; Rosenman, 1996; Wu, 2013). Students who have not developed study skills and a solid foundation of knowledge in the field, or who have not studied for many years, make up a greater proportion of first year university students than ever before, and these students are at risk of poor educational outcomes. Student attrition has become a larger issue as a result, and costs $1.4bn per year in Australia (Hare, 2010; Mulholland, Anionwu, Atkins, Tappern, & Franks, 2008; Olsen, 2008). Kift (2014) asserts that it is important not to blame students for perceived inadequacies. Instead, academics need to offer transition assistance in all disciplines. There is a need to make first year student learning, success and retention the core business of the successful administration of higher education (Kift).

Literature review

University allied health professional programs have long recognised the importance of introducing science courses, such as foundation sciences, anatomy, physiology and pathophysiology, in the earlier part of these programs, many of which build on a background knowledge of science. Although there are no prerequisites to enter into most allied health science programs, there is certainly an assumed knowledge of science. With the emergence of mass higher education, a greater proportion of students are now securing a place in allied health science programs without prior knowledge of science (James, Krause, & Jennings, 2010). These students may be recent school leavers who have not studied science, rural students for whom subject availability is minimal, or mature age students who have not studied science for several years. Indeed, 38% of nursing students did not have any background of science knowledge in the University of South Australia (UniSA) 2012 nursing cohort. It is therefore unreasonable to assume that all first year health science students can immediately orientate themselves in core science courses. Commencing students who struggle to understand the basics of sciences in their area of study are delayed in their academic progress, and may not be willing to persist when encountering challenges (Sturges & Maurier, 2013). Health Science student pass rates in science modules are lower in comparison to the pass rates of the professional modules (Higgins-Opitz & Tufts, 2014). This shows that student success rates in courses that assume prior knowledge (science modules) is not on a par with courses that do not (professional modules).

Mass higher education brings with it a greater diversity of students' educational and socio-economic backgrounds. In the UniSA 2012 nursing cohort, 55% of students were mature-age entry, 38% had a non-science background, and 29% were from a non-English-speaking background. A greater proportion of students are now encountering major educational challenges quite apart from a lack of scientific knowledge. This can include difficulty reading literature and memorising substantial amounts of information, the inability to make connections between multiple disciplines, and the preponderance of brand-new medical terminology (Strube, Thalluri, & Kokkinn, 2004; Sturges & Maurier, 2013). In Australia, research on students' difficulties has revealed that the most recurrent problems that lead to students terminating their studies include overloaded curriculum, loss of interest in the chosen area of study, perception of insufficient teaching and inadequate advice on overcoming academic problems (McInnis, James, & Hartley, 2000; Zeegers, 2001; Zeegers & Martin, 2001). It appears evident that assistance should be given to students in the broad variety of skills

necessary for a successful university experience, such as foundational/assumed knowledge, study skills, and social and academic engagement. Such assistance will aim to improve the university experience and thereby improve retention and student success.

The importance of a positive and successful experience in the first year of higher education in completing a degree has been amply described (Twigg, 2009). In 2009, a study by Thalluri and King (2009) reported the students' perception of not feeling prepared for university studies and determined the importance of providing early support to first year students. Upon receiving early attention from the academic staff and the university, students reported an increase in positive experience throughout the first year of university and were less likely to withdraw from their course. As a result, students were more motivated to complete their first year and subsequently aim to complete their programs of study (Thalluri & King). Assistance before and during first year is thus of especial importance, and is provided in an evolving variety of ways at UniSA.

In order to progress positively with first year learners, the UniSA Learning and Teaching Unit (LTU) has organised campus- and program-specific facilities, orientation programs and processes to help students succeed in their learning. These include orientation activities to introduce first year students to library services, the peer mentoring program, appropriate pedagogies in learning science courses, and the university learning advisory services that work closely with students to enrich their academic skills (Benson, Hewitt, Devos, Crosling, & Heagney, 2009; Penman & Thalluri, 2014). Assistance is also given in the use of information technology, to endow students with the skills to utilise online learning resources and interactive discussion forums. The *Preparing for Health Sciences* workshop is another activity that has been introduced to provide students a smooth transition to university studies.

The *Preparing for Health Sciences* workshop

The *Preparing for Health Sciences* (PHS) workshop is similar to a bridging course. Students who attend this one-week intensive, optional, preparatory short course are enrolled first year health science students who are new to university education and desire some aid to fill in the gaps in their background knowledge of science and health science. It is aimed at mature-age students (>21 years of age), international students, students with little or no background in biology, chemistry or physics, and students who are anxious about starting university studies. The workshop also aims to facilitate meaningful engagement with the university by meeting the academic staff, networking with peers and become familiar with the campus and support systems available. As discussed previously, these are known factors in a positive student experience and thereby contribute to student retention and academic success.

The workshop ran from 9.00 am to 4.30 pm for four consecutive days. Students were introduced to a series of lectures and activities designed to convey basic scientific ideas that would feature in all programs in the Division of Health Sciences. The workshop opened with a lecture on study skills to provide students with successful learning processes and approaches. The key point given to the students was to focus on their individual learning styles. Students were also directed to the LTU learning advisers if further consultation was desired. After the opening lecture, a general overview of the human body organisation, followed by an introduction to medical terminology, was presented to the students. Students were shown how to read and understand medical terms, in order to develop the basics of understanding the language of

science and health science. For the rest of the workshop, students were introduced to the basics of biological, physical and chemical sciences that are necessary to understand physiological concepts, using a variety of teaching methods, including interactive lectures, tutorials, discussions, practicals and self-assessment. Students were also engaged in interactive learning sessions such as the viewing of human organs in the pathology museum and anatomy laboratory. Towards the end of the workshop, students were given an informal self-assessment test. The test was marked and returned to the students with feedback. This test was for students to identify their weaknesses, and also gauge how much knowledge they had attained during the week-long workshop. A certificate of completion was also provided to each attendee on the last day of the workshop.

Particular attention was given to the facilitation of networking with students and academics. Students are more likely to succeed if they develop a social network early at university (Wilson, 2012). During practical sessions, students were grouped according to their disciplines, allowing students to develop social networks that could be carried into first year and beyond. Lunch was provided daily, and during this time students had the opportunity to meet students from their own and other disciplines, their course coordinators and program directors and to form early study and social groups with their peers.

This paper presents an evaluation of the effectiveness of the 2015 UniSA PHS workshop in assisting students' transition to higher education.

Method

The PHS workshop study was initially conducted in 2014, and informed the template for both the workshop and its study in 2015. The PHS workshop was conducted one week prior to orientation week, soon after students had received their university offers. It was recommended to those that had no or little background in sciences, had not studied a science subject in year 11 or 12, or for whom English was a second language. Workshop evaluation was conducted as optional surveys in three focal stages: pre-workshop, post-workshop and after the first semester of study. Due to logistical constraints, this study utilises 2015 pre- and post-workshop data, and 2014 post-semester data.

The surveys contained a foreword on their purpose and consent was assumed from participation. Confidentiality was maintained through anonymity. Ethics approval had been obtained from the university's Human Research Ethics committee for one group of study encompassing internal and external students.

In 2015, a variety of demographic information, especially pertaining to educational background, was obtained in the pre-workshop survey. Students were also asked to select from a provided list of reasons for choosing the workshop, rank the predicted usefulness of the topics, say how they felt about starting university, give reasons for any anxiety over starting university, state their anticipated outcomes for the workshop, and say whether they expected that the workshop would help them start their university degree.

The post-workshop survey once again queried the usefulness of topics, their feelings about starting university, the outcomes of the workshop, and whether they expected that the workshop would help them start their university degree. The survey used a Likert scale to ask students whether they would recommend the workshop to other students and their opinion of the quality of the workshop. Helpfulness of the teaching staff was assessed. Opinion was sought on the provided lunch, wherein students could choose more than one answer as well as provide comments. Students were invited to comment

on the strengths and weaknesses of the workshop for future improvement, and an open-ended comment section was also provided. This allowed for qualitative data with a phenomenological approach to gain a richer insight into the students' experiences.

The post-semester survey was administered via email in 2014 after the first semester of university was complete to assess the effectiveness of the workshop in the students' opinions. Attrition rate for the workshop cohort was also determined. Statistical analyses in the form of chi square tests were performed for data in Figures 3-5.

Results

In 2015, a total of 105 incoming allied health science students from various programs enrolled in the optional PHS workshop. Although not all students answered every question, 78 (74%) students responded to the surveys. This cohort was comprised of 43 (59%) school leavers and 30 (41%) mature age students. The majority of the cohort (40; 53%) were nursing or midwifery students (internal and external). The range of health science students included 8 (11%) human movement and health studies, 5 (7%) medical sciences, 4 (5%) each of occupational therapy and physiotherapy, 3 (4%) nutrition and food sciences, 2 (3%) health science, and 1 (1%) each of pharmacy, podiatry, pharmaceutical sciences, and laboratory medicine. Two (3%) were in an unspecified allied health program.

The majority of students enrolled in the workshop were female (59; 78%). Twelve students (16%) identified English as their second language. The majority (68; 91%) of students were internal. There were more school leavers (43; 54%) than mature entry students. The majority of students (58; 81%) had been in the education system within the preceding five years, including 49 (68%) within the past year. The majority of students (56; 74%) reported little or no science background. First members in the family to attend university comprised a substantial proportion of the workshop cohort (28; 36.8%). Five people, or 6.7%, identified as being of Aboriginal or Torres Strait Islander origin.

The most popular reason for enrolling in the PHS workshop was a desire to gain the fundamentals of science knowledge (63; 87%), followed by a desire to transition smoothly into university study (55; 73%) (Figure 1). The opportunity to network with peers or staff was not highly rated (30; 40% and 31; 41%, respectively) (Figure 1).

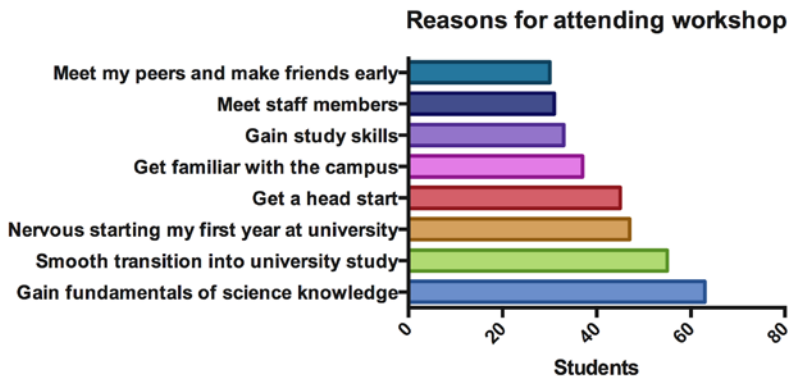

Figure 1: **Number of students selecting each reason for attendance**

In the pre-workshop survey, medical terminology was anticipated to be the most useful topic to cover, with a score of 5.78 gleaned from ranking of topics (Figure 2), and was still thought to be the most useful in the post-workshop survey, earning a ranking score of 6.34 (Figure 2).

The body systems topic appeared to have been slightly less useful than anticipated, and the body organisation topic slightly more so. Study skills and homeostasis were both more useful than anticipated, while chemistry was noticeably less useful.

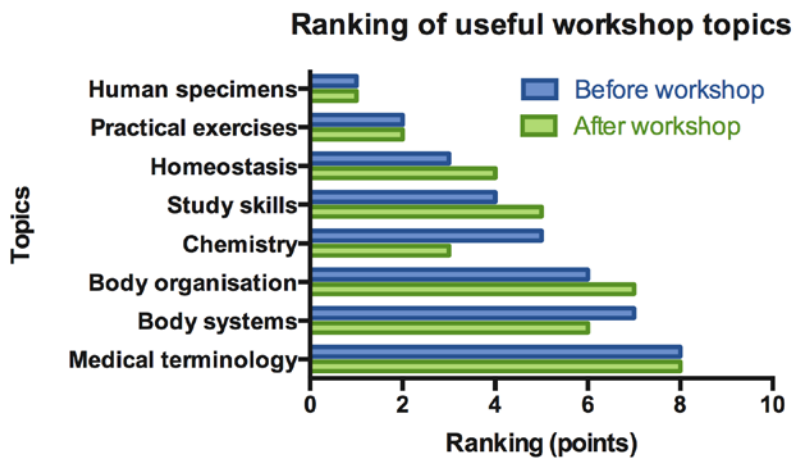

Figure 2: **Ranking of topics for usefulness**

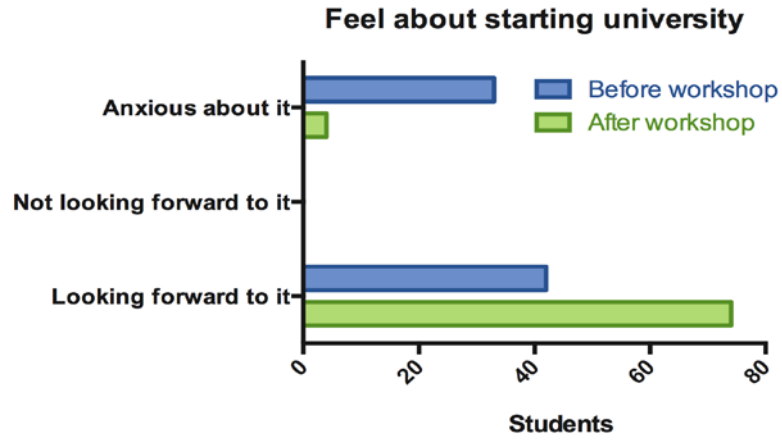

Figure 3**: Students' feelings about starting university**

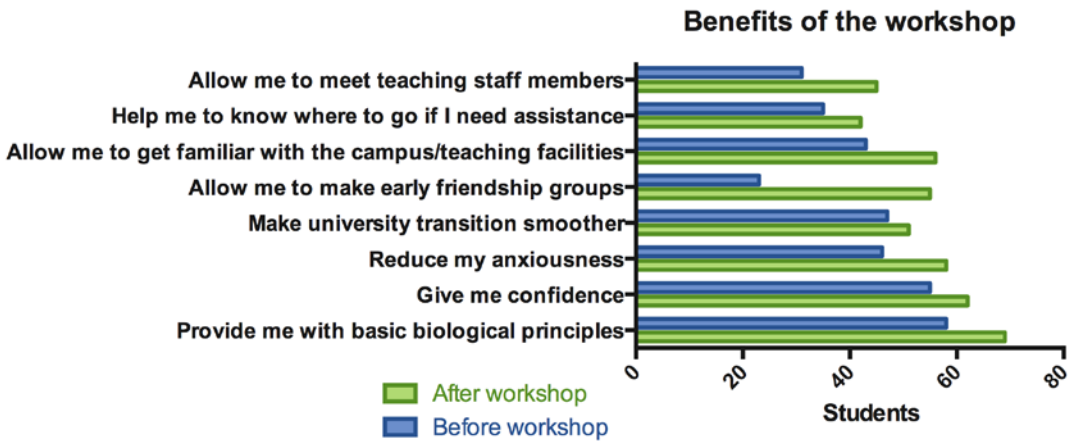

Figure 4: **Number of students agreeing with the suggested benefits**

Before the workshop 42 students (56%) were looking forward to starting university while 33 (44%) felt anxious about it (Figure 3). After the workshop 74 students (95%) reported that they were looking forward to starting university. A chi-square test for trend revealed a significant trend towards looking forward to university after attending the workshop (ChiSq=32, *df*=1, $p<0.0001$). Students endorsed a variety of benefits of the workshop (Figure 4).

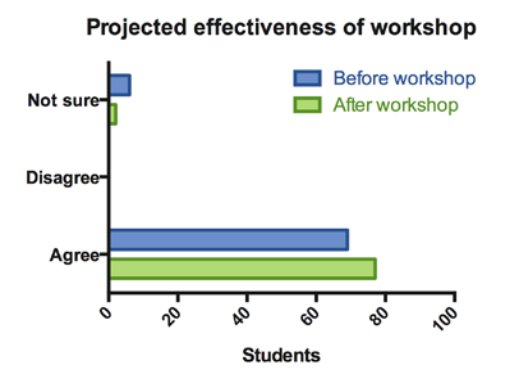

Figure 5: **Student estimation of the effectiveness of the workshop in easing the transition into the first year**

The opportunity to learn basic biological principles was predicted to be the greatest outcome (58; 76%), and remained so in the students' opinion after the workshop (69; 87%). All other listed benefits were recognised by more people after the workshop than before, in particular the opportunity to make early friendship groups, although chi-square analysis was not significant.

Before the workshop, 69 or 92% of students anticipated that it would be effective (Figure 5). This rose after the workshop (77; 97%), but not significantly. Almost all of the survey participants (76; 97%) would recommend this program to other students. All 79 students (100%) were satisfied with the quality of the workshop. Likewise, all students considered the staff friendly and helpful.

Respondents were given the opportunity to comment on the strengths and weaknesses of the workshop. Comments revealed the following five strengths: 1) increased confidence and decreased anxiety surrounding the transition into higher education, 2) good approachable source of introductory/foundational knowledge, especially science knowledge, 3) opportunity

to meet and familiarise themselves with the lecturers and coordinators, 4) engaging and dynamic format, 5) opportunity to interact with fellow students, and 6) insight into the university learning environment and study expectations. The one recurring negative comment was that some modules, especially lectures, felt a bit rushed, and that lecture handouts could be clearer.

The provision of lunch every day was foremost considered by respondents to be time efficient (58; 73%), but was also strongly acknowledged as an opportunity for students to get to know each other (56; 71%) and to make early friendship groups (40; 51%).

The 2014 post-semester survey achieved 49 responses (53%), with 48 students (98%) reporting that the workshop was either extremely useful, or useful, on a Likert scale. There was agreement by N46 or 94% of the respondents that other students would benefit from participating in this workshop and that they would recommend it to future first year students. Moreover, N45 or 92% of students reported that their first year university experience was positively enhanced because of having attended the workshop. Additionally, almost all (N48) of students believed that the workshop had provided an opportunity to learn fundamentals that are necessary to understand science courses in their respective allied health programs.

In the 2014 cohort post-semester survey, 27 students (55%) provided comments, with a majority giving positive feedback and constructive criticism. The two main themes were the usefulness of the science knowledge and the confidence gained through attendance at the workshop. The success of the workshop was exemplified in the comment: *If I did not attend this workshop, I would have struggled in my science courses and probably withdrawn from my studies.*

Discussion

The idea of a bridging course in some disciplines such as mathematics is not new, but is currently not widely utilised in other science disciplines (Boland, 2002). This study has demonstrated the benefits that students gain by undertaking the PHS bridging workshop as a part of their transition into first year university study of health science programs. Transition is defined as the process of changing from one state to another and there are various types of transitions to the tertiary education system (Terenzini et al., 1994). These include the transition experiences of school leavers, first family members, mature age students and international students or students from different cultural backgrounds (Choy, Horn, Nuñez, & Chen, 2002; Terenzini et al.). Their prevalence has been clearly identified in this study. Such diversity is associated with an increased proportion of difficult transitions, and help and intervention are important to mitigate the unfavourable attrition rate that results. The bridging workshop is an integral component of this aid.

Students enrolled in the workshop were from a wide range of health science programs. The ATAR[1] to enter into these programs varied from >95 (e.g. Medical Radiation) to low 60 (e.g. Nursing). The desire to smoothly transition into university was a strong reason for enrolment in the workshop, chosen by 73% of students or N55 (Figure 1). The majority (43; 59%) were school leavers, but mature age entry students made up a large proportion (30; 41%). This highlights the rationale for assistance, since the challenges of transition to first year university are greater for mature age students. Furthermore, 68% of students (49) had been in the education system within the

[1] The Australian Tertiary Admission Rank (ATAR) is a managed percentile score for each student relative to their peers, issued upon completion of their secondary education. It allows students with diverse course combinations to be compared, and is a major consideration for university entry

last year, and first members in the family to attend university comprised a substantial proportion of the workshop cohort (28; 36.8%). Taken together, these facts indicate that unfamiliarity with university was a principal concern among students and a strong motivator for enrolment in the workshop. The provision of a guided introduction to higher education that includes an outline of student expectations is therefore necessary in promoting comfortable and successful student transition. To this end, as part of the workshop students were provided the opportunity to rapidly engage with the university setting via the introduction to the learnonline resources (http://w3.unisa.edu.au/learnonline/) campus facilities and an *access plan* for students with learning or physical disability. The efficacy of the workshop in this regard is clearly demonstrated by the significant trend towards looking forward to starting university after attending the workshop ($p<0.0001$), and the fall in student anxiety from 44% (33 students) before to 5% (4) after the workshop.

The majority (56; 73%) of students had little or no science background, and the most popular reason students chose for enrolling in the workshop was to gain the fundamentals of science knowledge (63; 87%). Given that familiarity with basic science is assumed in health science courses, this is a valid and laudable concern, and the majority of the workshop was devoted to providing students with the foundations of this knowledge. Medical terminology, body organisation, body systems, homeostasis, and chemistry were among the topics given, as well as practical exercises to help solidify and integrate this information. Students anticipated four of these science topics to be the most useful overall, and this was borne out in the post-workshop survey (Figure 2). The chemistry module was alone in being considered less useful post-workshop, possibly because it was the most conceptually difficult science topic included, there were time constraints, and students were unaware of the relevance to their future profession. The student opinion that medical terminology is the most useful topic to cover before the workshop, and the increased consensus after the workshop (Figure 2), demonstrates that the workshop was effective in both conveying core knowledge and in boosting student confidence in their academic skills. The high importance given to science knowledge is further exemplified by the greatest proportion of students considering the opportunity to learn basic biological principles to be a benefit of the workshop, both before and even more so afterwards (Figure 4). The workshop was effective in providing students with the science knowledge that they needed and considered important.

The opportunity to network with peers was considered a reason to attend the workshop by a minority of the cohort (30; 40%) (Figure 1); however, the provision of lunch every day increased appreciation of this opportunity (albeit without statistical significance). Despite this, the time efficiency was considered the greatest benefit of provided lunch (58; 73%). Previous studies have reported a positive correlation between early engagements in university studies and success rate (Thalluri & King, 2009; Webster & Chan, 2009), which students appear to underestimate, so the workshop's facilitative role is important. Furthermore, student engagement supports active and self-directed learning, which is the cornerstone of success in higher education (Doring, Bingham, & Bramwell-Vial, 1998). An introduction to study skills in the workshop served to highlight the self-directed nature of higher education. Care was taken to emphasise that lecturers and administrators are eager to facilitate students' academic pursuits, but will not drive them. It is noteworthy that the workshop allows administrators to provide information that students do not anticipate to be necessary for their success in higher education.

The workshop can be considered highly successful. Students' estimation of the

effectiveness of the workshop was high, rising from 92% (69) pre-workshop to 97% (77) post-workshop. All the students were satisfied with the quality—97% (76) would recommend it to other students immediately post-workshop, and 94% (49) would still recommend the workshop after the first semester of study. Many of the comments affirmed decreased anxiety and increased confidence in a successful transition to university. Importantly, numerous student comments after the semester asserted that they might have abandoned their studies had it not been for the PHS workshop: *I truly believe if I had not attended this course I would be struggling immensely with my first year and probably considering dropping out.* The attrition rate of the 2014 workshop cohort was 7.6% (N92), as opposed to 12% in general for science-based courses (Hare, 2010; Olsen, 2008). From this, it appears that the aim of the workshop—which is to smooth the transition to higher education and thereby improve retention of the increasingly diverse and ill-prepared cohorts of students—has been achieved. However, this lower attrition rate may be due to keen and proactive students enrolling and completing the workshop.

Conclusion

Mass education has brought with it a greater proportion of students with large disparities in their knowledge and learning styles compared to what is required for success in a health science program. It is important for tertiary education administrators to recognise this disparity and support the evolution of their students. This is particularly important in the initial year, which can be the most critical in the academic life of a student in terms of engagement, learning, retention and success. Negative experiences in this first year can lead directly to failure or withdrawal. This investigation shows that an introductory workshop may be one of the keys to resolving this gap in fundamental knowledge and for gaining the study skills and confidence required for success in higher education in all disciplines. Furthermore, it reveals that unfamiliarity with university is a major concern for students that can be alleviated with the help of an introductory workshop. Thus, the *Preparing for Health sciences* workshop acknowledges and supports the diversity and changing social and educational needs and aspirations of freshly entering university cohorts. It also connects new learners with their teachers and peers early in a community committed to learning, provides the critical foundation for transition to learning success in later years and enhances student satisfaction, course experience and retention. The overall implication will be increased completion of university programs, which is the ideal outcome for students, universities and their society.

Acknowledgements to Ms Rajini Lagiseti in assisting with the manuscript preparation.

References

Benson, R., Hewitt, L., Devos, A., Crosling, G., & Heagney, M. (2009). Experiences of students from diverse backgrounds: The role of academic support in the student experience. In *The Student Experience, Proceedings of the 32nd HERDSA Annual Conference, Darwin, 6-9 July 2009* (pp. 545-550). Retrieved from http://www.herdsa.org.au/wp-content/uploads/conference/2009/papers/HERDSA2009_Benson_R.pdf

Boland, J. (2002). The mathematics bridging course at the University of South Australia. *Proceedings of the 2nd International Conference on the Teaching of Mathematics, Crete, 1-6 July 2002.* Retrieved from http://www.math.uoc.gr/~ictm2/Proceedings/pap213.pdf

Choy, S., Horn, L., Nuñez, A.-M., & Chen, X. (2002). Transition to college: What helps at-risk students and students whose parents did not attend college. *New Directions for Institutional Research*, *2000*(107), 45-63. doi: 10.1002/ir.10704

Doring, A., Bingham, B., & Bramwell-Vial, A. (1998). Beginning university: The need to rethink. *HERDSA News, 20*(3), 12-13.

Hare, J. (2010, October 20). High university drop-out rates cost $1.4bn. *Higher Education, The Australian*. Retrieved from http://www.theaustralian.com.au/higher-education/high-university-drop-out-rates-cost-14bn/story-e6frgcjx-1225940860074

Higgins-Opitz, S. B., & Tufts, M. (2014). Performance of first-year health sciences students in a large, diverse, multidisciplinary, first-semester, physiology service module. *Advances in Physiology Education, 38*(2), 161-169. doi: 10.1152/advan.00067.2013

James, R., Krause, K-L., & Jennings, C. (2010). *The first year experience in Australian universities: Findings from 1994 to 2009. Centre for the Study of Higher Education, The University of Melbourne.* Retrieved from http://www.cshe.unimelb.edu.au/research/experience/docs/FYE_Report_1994_to_2009.pdf

Kift, S. (2014). *Student success: Why first year at uni is a make-or-break experience*. Retrieved from https://theconversation.com/student-success-why-first-year-at-uni-is-a-make-or-break-experience-21465

Lowe, H., & Cook, A. (2003). Mind the gap: Are students prepared for higher education? *Journal of Further and Higher Education, 27*(1), 53-76. doi: 10.1080/03098770305629

McInnis, C., James, R., & Hartley, R. (2000). *Trends in the first year experience in Australian universities.* Melbourne, Australia: Centre for the Study of Higher Education, The University of Melbourne. Retrieved from http://www.cshe.unimelb.edu.au/research/experience/firstyear_trends.html

Mulholland, J., Anionwu, E., Atkins, R., Tappern, M., & Franks, P. (2008). Diversity, attrition and transition into nursing. *Journal of Advanced Nursing,* 64(1), 49-59. doi: 10.1111/j.1365-2648.2008.04758.x

Olsen, A. (2008). *Staying the course: Retention and attrition in Australian universities.* Hong Kong: Strategy Policy and Research in Education Ltd. Paper for the Australian Universities International Directors' Forum, October 2008. Retrieved from http://www.spre.com.au/download/AUIDFRetentionResultsFindings.pdf

Penman, J., & Thalluri, J. (2014). Addressing diversity in health science students by enhancing flexibility through e-learning. *The Electronic Journal of e-Learning, 12*(1), 89-100. Retrieved from www.ejel.org/issue/download.html?idArticle=270

Rosenman, L. (1996). *The broadening of university education: An analysis of entry restructuring and curriculum change options.* Evaluations and Investigations Program, 96/12. Canberra, Australia: Australian Government Publishing Service. Retrieved from http://hdl.voced.edu.au/10707/120963

Strube, P., Thalluri, J., & Kokkinn, B. (2004). Strategies for success in Human Biosciences. In H. Calabretto & B. Kokkinn (Eds.), *Strategies for success in nursing studies* (2nd ed., pp. 107-113). Adelaide, Australia: School of Nursing & Midwifery, University of South Australia.

Sturges, D., & Maurier, T. (2013). Allied health students' perceptions of class difficulty: The case of undergraduate human anatomy and physiology classes. *The Internet Journal of Allied Health Sciences and Practice, 11*(4). Retrieved from http://ijahsp.nova.edu/articles/vol11num4/pdf/sturges.pdf

Terenzini, P., Rendon, L., Upcraft, M., Millar, S., Allison, K., Gregg, P., & Jalomo, R. (1994). The transition to college: Diverse students, diverse stories. *Research in Higher Education, 35*(1), 57-73. doi: 10.1007/BF02496662

Thalluri, J., & King, S. (2009). Understanding and improving first-year university student experiences. *Journal of the World Universities Forum, 2*(1), 67-85. Available from http://wuj.cgpublisher.com/product/pub.173/prod.116

Twigg, C. (2009). Using asynchronous learning in redesign: Reaching and retaining the at-risk student. *Journal of Asynchronous Learning Networks, 13(*3), 147-155. Retrieved from http://onlinelearningconsortium.org/jaln_article/using-asynchronous-learning-in-redesign-reaching-and-retaining-the-at-risk-student-previously-published-in-jaln-81-2/

Webster, B., & Chan, W. (2009). First year transition experiences and effects on student learning outcomes. *In The Student Experience, Proceedings of the 32nd HERDSA Annual Conference, Darwin, Australia* (pp. 608-613).

Wilson K. (2012). *Student diversity and engagement in the first year experience: Facilitating the successful orientation, engagement & retention of commencing students.* Griffith University seminar. http://docslide.us/documents/student-diversity-engagement-in-the-first-year-experience-facilitating-the-successful-orientation-engagement-retention-of-commencing-students-professor.html.

Wu, P. (2013, July). *Bridging the transition process for first-year students in distance construction programs – a case study in Australia.* Paper presented at the 16th International First Year in Higher Education Conference, Wellington, New Zealand. Retrieved from http://fyhe.com.au/past_papers/papers13/11G.pdf

Zeegers, P. (2001). Approaches to learning in sciences: A longitudinal study. *British Journal of Educational Psychology*, *71*, 115-131. doi: 10.1348/000709901158424

Zeegers, P., & Martin, L. (2001). A learning-to-learn program in a first-year chemistry class. *Higher Education Research and Development, 20*(1), 25-35. doi: 10.1080/07924360120043630