Evaluation of a peer mentoring program for a mature cohort of first-year undergraduate paramedic students

Deanne H. Hryciw,1 Kathy Tangalakis,1 Briony Supple,3 and Gill Best3

1School of Biomedical and Health Sciences, Victoria University, Melbourne, Victoria, Australia; 2Department of Physiology, The University of Melbourne, Melbourne, Victoria, Australia; and 3School of Language and Learning, Victoria University College, Victoria University, Melbourne, Victoria, Australia

Received 18 September 2012; accepted in final form 15 January 2013

Hryciw DH, Tangalakis K, Supple B, Best G. Evaluation of a peer mentoring program for a mature cohort of first-year undergraduate paramedic students. Adv Physiol Educ 37: 80–84, 2013; doi:10.1152/advan.00129.2012.—The purpose of this study was to evaluate the effectiveness of a peer-assisted study session (PASS) program for a large class of Bachelor of Health Science (Paramedic) students. This cohort was made up predominantly of mature aged students who have not undertaken any study for many years. Within a bioscience first-year core subject, student mentees attended PASS sessions on a voluntary basis, with second-year Bachelor of Health Science (Paramedic) students acting as mentors. Mentors were recruited based on their outstanding academic performance in bioscience the previous year and selected based on group and individual interviews. Successful candidates participated in a compulsory 2 days of student mentor training and were supported throughout the program to develop their mentoring skills in both face-to-face workshops and online. Mentee students were allocated to a PASS session with a maximum size of 25 students/group that was facilitated by 2 student mentors. In general, the program was viewed favorably by both mentors and mentees. There was an increase in academic performance and a decrease in the fail rate of the mentee group compared with the cohort of students that did not participate in the PASS program. Importantly, mentees believed that the program improved their study skills and gave them confidence in their approach to studying. This is a significant consideration for the improvement of student transition and retention in a mature aged student cohort.

peer assisted; mature age; bioscience

STUDENT PEER MENTORING PROGRAMS operate at many tertiary education institutions worldwide. While the aims of these programs vary, they generally are implemented to improve one or more of the following: student retention, student learning outcomes, academic progression, and social support for new students. The pedagogies that inform peer mentoring are fairly consistent. A number of peer mentoring schemes in tertiary education settings are based on the principles of collaborative learning or on the closely related cooperative learning paradigm whereby students come together in semi-formal settings to learn. As this implies, student peer mentoring is usually intended to benefit both mentors and mentees (13).

One of Victoria University’s student peer learning models is known as peer-assisted study sessions (PASS), based on supplementary instruction (SI) in the United States of America. The SI/PASS model is an academic assistance program that uses peer-assisted study meetings, with student mentors selected from second-year students with a high achievement in the previous year (13). PASS meetings are regularly scheduled, informal review sessions in which students compare notes, discuss readings, develop organizational tools, and engage in the understanding of core physiological concepts. A key feature of the PASS program is the absence of a teacher but the presence of one or two capable later-year peers who plan and facilitate the PASS meetings. The mentors’ role is to help assist the understanding of content. The PASS model also tends to be used in courses with “difficult content, a predominance of lectures, low rates of interactive teaching, and where assessment and monitoring are relatively infrequent” (13). Student mentors do not introduce new content but rather “model, advise, and facilitate” (13) content that has already been taught. Specifically, mentors would provide students with methods for understanding difficult concepts by developing organizational tools that assist in their understanding of the subject matter.

Undergraduate retention is a major concern for universities, and it is believed that failure of first-year undergraduate subjects is a significant factor leading to nonprogression and attrition of students (10). Importantly, the first year experience is essential for effective university progression and student retention (12). Many reasons can lead to students failing a subject. For example, if students are not engaged in the subject, this will reflect in poor attendance rates and poor marks/assessment outcomes (11). Furthermore, previous research has suggested that the success of students can be predicted by factors such as sex and age, with male students performing poorly and mature age students performing extremely well (8). The study by Lumb and Vail (8) was a retrospective cohort study, focused on the analysis of students that had completed a third-year clinical examination in a medical degree in an institution in the United Kingdom during the 1990s. However, no information on prior study or knowledge was provided by these authors, which may have influenced the success of this mature age cohort. Furthermore, failure of first-year subjects often leads to nonprogression (10). Thus, students that did not succeed in first year may not have been captured in this study. Students undertaking the Bachelor of Health Sciences (Paramedic) degree program at Victoria University (Melbourne, Victoria, Australia) undertake three semesters of bioscience (anatomy and physiology) as part of the undergraduate curriculum. The cohort is made up of a significant number of mature age students, where the entering age of commencing students is typically >25 yr old. Understanding of the key concepts of bioscience is an essential area for learning in the Bachelor of Health Sciences (Paramedic) degree program. Traditionally, this program focused on the key areas of physiology, such as cell and tissue structure and function, neuroscience, cardiovas-
cular physiology, renal physiology, and digestion. The teaching activities in bioscience consist of formal lectures, a practical session on microbiology, and tutorial classes. Most teaching activities are led by academic faculty members, and students largely act as passive recipients. Tutorial classes are usually conducted as traditional tutorials, which are led by faculty members. Many of the paramedic students often find the topics in bioscience difficult (9), which is compounded by their return to education as mature age students (4) or limited exposure to biology in their high school education (6). Thus, on entry to the course, these students are deemed to be at risk of failure.

The aim of this study was to assess first-year undergraduate student perceptions of the PASS program in a cohort of Bachelor of Health Science (Paramedic) students who were predominantly mature age. The data presented are representative of the subject conducted during semester 1 of 2010 and 2011, which involves two different cohorts of students.

RBM1107-STUDENT MENTORING PROGRAM EVALUATION - SEMESTER 1/2010/2011
Mentee program evaluation

General Questions
1. Are you male or female
2. In what year did you complete your High School education
3. Did you study Biology in Year 12? Yes No
4. Which degree course are you enrolled in
5. Are you full time or part time?
6. What is your post code?
7. Are you an international student? Yes No
8. Is English your second language? Yes No
9. If English is your second language, what language(s) is/are spoken at home?
10. Are you repeating the subject RBM1107? Yes No

Questions about the Mentoring Sessions
1. How many mentoring sessions have you attended out of 10?
2. Look at the table below and circle the number for each question that is closest to how you feel about the mentoring sessions.

Rating Scale:
5 = Strongly agree 4 = Agree 3 = Undecided 2 = Disagree 1 = Strongly disagree N/A = Not applicable

<table>
<thead>
<tr>
<th>Attending the Student Mentoring Sessions in RBM1107 has:</th>
<th>Strongly agree</th>
<th>Agree</th>
<th>Undecided</th>
<th>Disagree</th>
<th>Strongly disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Helped my confidence in this subject</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>2. Helped my knowledge in this subject</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>3. Shown me different ways of studying the material</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>4. Helped my approach to studies in other subjects</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>5. Made me feel positive about attending classes</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>6. Increased my friendship networks</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>7. Given me ways to tackle my studies in general</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>8. Helped me manage my time</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>9. This program has been a positive experience</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

What three things have you gained by attending the mentoring sessions?
What three things would you like to see change in future mentoring sessions?
Any additional comments

Fig. 1. Survey questions for mentees. Surveys were administrated to mentees at the final week of semester. Surveys consisted of nine closed-ended questions following a 5-point Likert scale and three open-ended questions.
METHODS

This study was approved by the Human Ethics Research Committee of Victoria University (HRETH 10/20). Undergraduate paramedic students in their first and second years of the Bachelor of Health Science (Paramedic) undergraduate program at Victoria University participated in the study. The 60 mentees in each PASS program were selected from students enrolled in the first-year subject Bioscience for Paramedics 1 (RBM1107) during semester 1 of 2010 (total of 269 enrollments) and semester 1 in 2011 (total of 214 enrollments). This selection occurred on a first come, first served basis, with students e-mailing the chief investigator after the advertisement of the program at the first lecture. The four mentors worked in pairs to facilitate weekly group PASS meetings. Mentors were students who had successfully completed RBM1107 the year before and obtained a high grade (at least 80%) in the subject. As well as participating in competitive group and individual interview processes, mentors were required to complete a 2-day training program before the first session, attend weekly workshops throughout the semester, and contribute to an online reflective blog about their mentoring experiences. PASS meetings were held once a week for 1 h for 10 wk during the semester. Areas of study focus were chosen by the mentors and were based on the content of formal lectures (by faculty members) and tutorials that were conducted parallel to the PASS meetings. Students not enrolled in the PASS program also were instructed via the formal lecture and tutorial sessions.

Student (mentee) opinion surveys were administered to students at the end of the PASS program (end of semester). The survey consisted of closed- and open-ended questions (Fig. 1). The closed-ended questions followed a Likert rating scale from 1 to 5 (where 5 = strongly agree, 4 = agree, 3 = undecided, 2 = disagree, and 1 = strongly disagree).

Student (mentor) opinion surveys were administered to student mentors at the end of the PASS program (end of semester). The survey consisted of closed- and open-ended questions (Fig. 2).

Median values for closed-ended survey questions for both the mentees and mentors were analyzed on the difference from the scale point of 3 (undecided) using a nonparametric Wilcoxon signed-rank test.

RESULTS

Student participation in the study was voluntary, and completion of the surveys was not required to participate in the PASS program. Approximately 80% of students were enrolled in RBM1107 STUDENT MENTORING PROGRAM EVALUATION - SEMESTER 1 / 2010 /2011

MENTOR PROGRAM EVALUATION

Please circle the most correct response:

1. Overall, I enjoyed my mentoring experience
   A lot Mostly Not very much Not at all

2. I felt supported by the staff while I was mentoring
   All the time Mostly Sometimes Not very often Not at all

3. Being a mentor has helped me:

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Undecided</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Develop my speaking skills</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>2. Develop my understanding of human bioscience</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>3. Develop my presentation skills</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>4. Develop my confidence</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>5. Feel more connected to the university</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>6. Meet new people</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>7. Feel more motivated to study</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
</tr>
</tbody>
</table>

4. What were the best things about being a mentor?
5. What were the worst things about being a mentor?
6. In what ways do you think you have changed personally as a result of mentoring?
7. Did you believe that mentoring would change you in any way?
8. Has being a mentor been a worthwhile experience? If so, how? If not, why?
9. In what way do you think being a mentor can help in your future career?
10. Any additional comments

Fig. 2. Survey questions for mentors. Surveys were administered to mentors at the final week of semester. Surveys consisted of 7 closed-ended questions following a 5-point Likert scale and 10 open-ended questions.
on a full-time basis. The mean age of students enrolled in RBM1107 was 25 ± 7 yr, with 42.1% (2010) and 45.1% (2011) of students being men and 57.9% (2010) and 54.9% of students being women (Table 1). These data were similar to data from all students enrolled in the subject, including those not attending the PASS program. In 2010, the ratio of male to female mentors was 1:3; in 2011, it was 2:2. Typically, each group consisted of 2 mentors with 30 mentees, assuming full attendance. Due to the number of mentors involved in the program, the maximum number of mentees was capped at 60 students. In each semester, 60 students were assigned to a PASS group after voluntary enrollment. This typically resulted in 2 PASS sessions running concurrently, with 2 mentors and a maximum of 30 mentees. Of the 60 students initially offered a PASS allocation, 55 and 50 students (2010 and 2011, respectively) attended at least 1 PASS session. The average number of PASS sessions attended was 6.3 and 6.1 of 10 total (63% and 61%, respectively). The mean grade for students enrolled in RBM1107 that did not attend PASS meetings was 61.7 ± 15.4% and 64.2 ± 18.1% (2010 and 2011, respectively). The mean grade for students enrolled in RBM1107 who also attended PASS meetings was 65.2 ± 12.4% and 74.0 ± 7.8% (2010 and 2011, respectively). The failure rate for students enrolled in PASS was lower compared with students not enrolled in PASS and in the same subject (12% vs. 4% and 18% vs. 0% in 2010 and 2011 respectively). Furthermore, this was an improvement compared with previous cohorts (students enrolled in 2008 and 2009 with no access to PASS), with an average grade of 58% and failure rate of 20%.

Of the 60 students allocated to PASS, 27 and 36 mentee (49% and 60% in 2010 and 2011, respectively) student opinion surveys were returned at the end of the semester, and all 4 mentor student opinion surveys (100%) were returned at the end of the semester. Fifty percent of students (mentees) who completed the survey were men and fifty percent were women. No students identified themselves as having English as a second language, which was representative of all students enrolled in RBM1107. Approximately 75% of students who completed the survey indicated that they had not completed biology in their final year of high school education.

_Mentee opinion surveys._ At the end of the PASS program, ~63% of mentees who responded to the survey indicated that they had a better understanding of bioscience, with 40% of mentees specifically saying that their knowledge had increased; 52% of mentees indicated that completing the PASS program gave them confidence in working in a group setting. The median and interquartile range from mentee student responses from closed-ended survey questions are shown in Fig. 3. The median and interquartile range from mentor student responses from closed-ended survey questions are shown in Fig. 4.

In general, students strongly believed that the PASS program helped them gain confidence in their understanding (median = 5, P < 0.0001) and knowledge in the subject (median = 5, P < 0.0001). In addition, students believed that the program helped them to develop different ways of approaching their studies in this subject (median = 4, P < 0.001) and other subjects in their degree (median = 4, P < 0.001), made them feel positive about their studies (median = 4, P < 0.001), and provided tools to ensure effective time management (median = 4, P < 0.001). Most students strongly agreed that the PASS program was a positive experience (median = 5, P < 0.0001; Fig. 3).

_Mentor opinion surveys._ At the end of the semester, the mentors indicated that the positive outcomes for them as mentors in the PASS program was being able to help the first-year students (50%) and the ability to improve knowledge...
How We Teach

in this group of students (37.5%). Furthermore, mentors believed that participation in the PASS program had developed their leadership skills, with mentors indicating that they were more comfortable in teaching students within a group setting as a result of this program (37.5%).

In general, the mentors believed that the program developed their oral communication skills (median = 4, \( P < 0.05 \)), their ability to understand bioscience (median = 4, \( P < 0.05 \)), and their general confidence (median = 4, \( P < 0.05 \); Fig. 4).

DISCUSSION

This study has demonstrated that PASS has been a valuable addition to the “Bioscience for Paramedics” subject taught to paramedic students undertaking the Bachelor of Health Sciences (Paramedic) at Victoria University. Specifically, peer mentoring was perceived to be beneficial by both mentors and mentees, which supports previous research (13). This may be due to the fact that students actively involved in learning tend to retain relevant information longer than if learned via passive means (3). Furthermore, the data demonstrate that peer mentoring enhanced student academic performance. This is supported by previous studies that demonstrated that attendance at PASS improved students’ academic performance (7). In this study, peer mentoring also enhanced students’ understanding of the subject matter, student confidence (both mentors and mentees), and provided student mentees with tools and strategies for approaching their studies, leading to better learning outcomes. These are essential tools in a commencing student cohort, who have limited and often no prior experience in biological sciences.

PASS meetings were introduced to enhance the first year experience and improve retention. These meetings were well attended, with 63% and 61% attendance (2010 and 2011, respectively), indicating that voluntary attendance was good. Student engagement was further supported by the mentee survey data, indicating that most students believed that the PASS program was a positive experience.

Previous research has indicated that one factor leading to poor success in subjects is due to poor social and academic integration with the institution (11). Our study indicated a positive contribution to students’ social and academic integration, with students reporting that participation in the PASS program increased their student networks (~19%), which, in turn, may have contributed to the success of the program.

One previous study (5) has suggested that mature age students are challenged by the university environment. One way to ensure that mature age students maintain their attendance record, which would lead to improved learning outcomes, is to increase student confidence (5). In our PASS cohort, ~88% of the mentees were mature age (nonschool leavers), and all mentors were mature aged. Importantly, we have demonstrated that the PASS program assisted in the development of confidence, as 52% of mentee respondents specifically indicated that participation in the program improved their confidence in approaching their studies. One way in which this may have occurred is via the development of learning strategies and social inclusion. These ideas are supported by Topping and Winterhoff (13), who suggested that collaborative learning, which is a fundamental element of the PASS program, is important for not just coping with academic issues but also to develop skills in teamwork, cooperation, and communication that may not be fostered in other components of their studies.

A clear limitation of this study is that we had no clear indication of the level of biology knowledge in the students before their enrollment in the PASS program. Our mentee survey data suggested that a clear proportion of them (75%) had not studied biology for a period of time. However, the selection of students for inclusion into the program was based on a first come, first served basis, with the first 60 students who indicated their willingness to be involved allocated a position in the PASS program. We indicated to the students that they should only volunteer if they had not done biology in their final year of high school or if they were returning to education after a period of absence. However, we may have allocated PASS positions to students that had a high level of biology knowledge. In addition, we did not ascertain the level of attendance at lectures, which may have reduced the grades of students not attending PASS. Lectures in the RBM1107 program are not compulsory, and we have no records of the total number of students at each lecture session. Anecdotally, we can comment that attendance at PASS was comparable with attendance at lectures. Furthermore, the lectures in RBM1107 are captured electronically, and students enrolled in this subject can access them online.

In conclusion, a PASS program is a practical and acceptable way of providing academic support to students. The benefits of this program may largely be due to the make up of the student cohort (in our case, largely mature age students) as well as the strengths of the student mentors.

DISCLOSURES

No conflicts of interest, financial or otherwise, are declared by the author(s).

REFERENCES