Learning enhancement by implementation of Peer Assisted Study Session (PASS)

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ABSTRACT

In Peer Assisted Study Session (PASS) senior students run discussion classes and help their juniors gain a better understanding of subjects. School of Engineering, Taylor's University College begins PASS programs for the first time in 2010. Current study runs objective and subjective evaluations to analyze possible effects of this program on student learning process. Objective assessments were based on statistical analyses of students' attendance and results before and after attending PASS sessions. Subjective evaluations were established on students' feedback. Both appraisals showed the positive achievements of the PASS program. Some shortcomings were also addressed and possible improvements suggested.

***Keywords**: Peer Assisted Study Session, learning enhancement.*

INTRODUCTION

Fast development of science and technology necessitates to innovative teaching and learning techniques. Peer Assisted Study Session (PASS) is one of these methods that are categorized under the student-centered learning approaches. Skalicky *et al*. (2010) studied the utilization of this program in Australia which is being practiced in 25 institutions and within various disciplines. They focused on two tactical regions that influence the effectiveness of peer learning sessions:

- Facilitating the institutional and funding requirements.
- Employ, instruct and improve the personal and professional characteristics of PASS leaders.

At the University of Wollongong (UOW) it started at 2002 and for the first five years, they initiated this technique for difficult subjects like computer science, mathematics, chemistry and economics. Thereafter it was expanded to law, arts and medicine faculties. Currently UOW carry outs the most diverse PASS program among Australian universities consisting of nine faculties covering first year, second year and postgraduate modules. Twenty five institutions in Australia, New Zealand and Malaysia have benefited through collaborating with UOW's PASS team. Deakin University launched this program in 2009 with an accounting unit and put much effort on recruitment and training of PASS leaders. University of Tasmania (UTAS) introduced PASS for first semester students in 2007 which increased the interest of both students

and academics and led to the development and execution of the program for 1500 students in 2009 (Skalicky *et al*. 2010).

The benefits of the PASS program are not only for students attending the classes but also enhances the mentoring and leadership characteristics of the students who are employed to run the classes. Morrison (2007) studied the students' experience and feedback through anonymous surveys and focus groups. She found PASS as a good solution for high failure rate and a response to large growth in student numbers without adding additional workloads for lecturers. She also highlighted that one of the exceptional features of PASS is the level of employed students. They are carefully selected and have outstanding marks in the module that they help with also an overall high CGPA. Therefore attending students may be trained both from group studying and recent learning experiences of PASS leaders. This communication is very crucial in higher education programs as normally students and lecturers have little personal contact (Fines 2000). Students need to be active in the class is they are seeking for solutions as facilitators do not simply give them the answers. The factor of motivation is targeted because students have discussions with other interested peers; share ideas for a better understanding and will obviously conduce to learn from each other. One of the reasons may be the informal environment of PASS classes compared to lectures and tutorials, so students feel relaxed and try to operate naturally and engage themselves with the subject (Morrison 2007). The student-centered characteristic of PASS enhances retention because these classes are focused on students' weaknesses and they also appreciate the support of the institution in rectifying their problems. And all of this happens without adding any workload to the lecturers (Zepke *et al*. 2006).

Many studies are comparing the learning performance of students when they work individually versus working in groups. Topping and Ehly (2001) mentioned that "the longest established and most intensively researched forms of peer learning are peer tutoring and cooperative learning". Capstick *et al*. (2004) described this teamwork in four categories:

1. Facilitator re-explains the subject for those who still have problem in concepts.
2. Students discuss about the subject and various ideas are shared and examined.
3. Facilitator mentions about his own experience and help students to improve on his/her faults.
4. Students may be split into various groups to discuss their different questions.

Miller *et al*. (2006) stated that cultural differences can affect the learning process during the lectures and tutorials. Some cultures emphasize rote education, being a passive recipient or they will not challenge the lecturer about the subject. But in PASS sessions students are encouraged to ask questions, actively participate in discussions and take responsibility for their learning. In a recent approach (Ladyshewsky & Gardner 2008), a group of physiotherapy students initiated online collaboration (blogs) to share clinical fieldwork among a vast number of students in a diverse and geographically spread program. Each blog group comprised of four to five students and was moderated by an academic who guided and challenged bloggers to make more contributions, share ideas and take part in discussions. An external source (http://www.blogger.com) was implemented deliberately so students would feel that their blogging was not limited by the university organization and so they can continue this activity even after their formal education.

School of Engineering, Taylor's University College implemented the PASS program for the first time in 2010. This current paper contains closer insights into the program, its effects on the learning quality, students' feedbacks and possible points that still need more emphasis and improvements.

OBSERVATIONS

This study focused on two modules, namely; Statics and Fluid Mechanics, and tried to highlight the PASS achievements through objective and subjective evaluations. Objective evaluations deal with statistical analyses on students that attend PASS sessions and seek their possible progression in this way. Objective assessment is based on the final semester surveys and students' feedback regarding the program.

Table 1: Analyses of students' results who attended PASS classes, Statics module, batch 1.

No	PASS Class Attendance (%)	Total Result	
		Mark (%)	Grade
Grade	1	100	B-
64	B-	2	C+
50	59	C+	A-
3	50	76	A-
A-	4	50	B+
78	A-	5	B
17	73	B+	A
6	50	65	A-
B	7	33	A-
86	A	8	A-
67	75	A-	C+
9	33	78	A
A-	10	83	C+
77	A-	11	A
33	58	C+	A
12	33	83	A

Failing rate	0%	(No of Fail/Total Numbers)
Obtained A/B	81%	(No of students obtained A/B divided with total)
Obtained C/Pass	19%	(No of students obtained C and above)
Passing rate	100%	(Total number of passes)
Students attended ≥50% of the sessions	56%	

For each of the modules two separate PASS classes were organized and two PASS leaders were assigned for each class. Students had the option of attending any of the two available classes according to their time-table and interest in the PASS leaders. The first column in Tables 1 to 4 shows the number of students who were present at each batch. Second column shows the percentage of their attendance in PASS program throughout the semester. Third and fourth columns demonstrate total results of the students in the percentage and grade formats for the specified module.

Tables 1 and 2 illustrate that for the Statics module, students who were interested in the PASS program and attended equal or more than 50% of the classes were 56% and 47% for batch 1 and 2, respectively. None of these students failed as the passing rate was 100% for all of the PASS attendees. Moreover these students exhibited good results as 81% and 88% in batch 1 and 2, respectively achieved a grade of A or B in the total results. Another highlight was that all of the students who got grades C+ or below only attended less or equal to 50% of the sessions.

Table 2: Analyses of students' results who attended PASS classes, Statics module; batch 2.

No	PASS Class Attendance (%)	Total Result	
		Mark (%)	Grade
1	33	86	A
2	17	75	A-
3	17	63	A
4	17	85	A-
5	83	76	B-
6	17	63	C+
7	17	59	B-
8	17	61	A-
9	83	76	A-
10	67	83	A
11	50	64	B-
12	50	80	A
13	100	75	A-
14	100	85	A
15	33	83	A
16	50	53	C+
17	33	72	B+

Failing rate	0%	(No of Fail/Total Numbers)
Obtained A/B	88%	(No of students obtained A/B divided with total)
Obtained C/Pass	12%	(No of students obtained C and above)
Passing rate	100%	(Total number of passes)
Students attended ≥50% of the sessions	47%	

Table 3: Analyses of students' results who attended PASS classes, Fluid Mechanics module; batch 1.

No	PASS Class Attendance (%)	Total Result	
		Mark (%)	Grade
1	100	64	B-
2	50	59	C+
3	50	53	C
4	25	60	B-
5	25	67	B
6	25	83	A
7	25	61	B-
8	50	54	C
9	25	59	C+
10	50	57	C+

11	50	64	B-
12	50	62	B-
13	75	58	C+
14	50	84	A
15	25	73	B+
16	25	68	B
17	25	80	A
18	100	52	C
19	25	74	B+
20	25	62	B-
21	25	41	D
22	25	47	D+
23	25	73	B+
24	25	69	B
25	25	80	A
26	25	59	C+

Failing rate	8%	(No of Fail/Total Numbers)
Obtained A/B	62%	(No of students obtained A/B divided with total)
Obtained C/Pass	31%	(No of students obtained C and above)
Passing rate	92%	(Total number of passes)
Students attended ≥50% of the sessions	38%	

Tables 3 and 4 present objective assessment for students attending Fluid Mechanics module in the two available batches. The first batch consisted of 26 students but only 38% of them attended greater or equal to 50% of the sessions. On the other hand surprisingly only 10 students attended the second batch and only 50% of them attended equal or higher than 50% of the classes. Failing rates were 8% and 30% for batch 1 and 2, respectively and 60% of students in the two batches obtained grades A or B. Besides 78% (11 out of 14) of students who achieved C+ or below were only present at less or equal to 50% of the PASS classes.

Table 4: Analyses of students' results who attended PASS classes, Fluid Mechanics module; batch 2.

No	PASS Class Attendance (%)	Total Result	
		Mark (%)	Grade
1	100	81	A
2	100	87	A
3	50	81	A
4	25	54	C
5	25	40	D-
6	25	32	F
7	75	34	F
8	25	75	A

9	50	80	A		
10	25	69	B		
Failing rate				30%	(No of Fail/Total Numbers)
Obtained A/B				60%	(No of students obtained A/B divided with total)
Obtained C/Pass				10%	(No of students obtained C and above)
Passing rate				70%	(Total number of passes)
Students attended ≥50% of the sessions				50%	

In Figs. 1 and 2, 25 students were randomly selected in each module and their results before and after attending PASS sessions were compared. Apart from some exceptions, generally attending PASS classes enhanced students learning and showed an increase in their marks. It should be noted that "Before PASS" marks are related to their first assessment (Test 1) so it only consisted a limited portion of the learning outcome. Nevertheless "After PASS" marks are acquired from the final exam results that covered the whole learning outcome and required more practice and readiness.

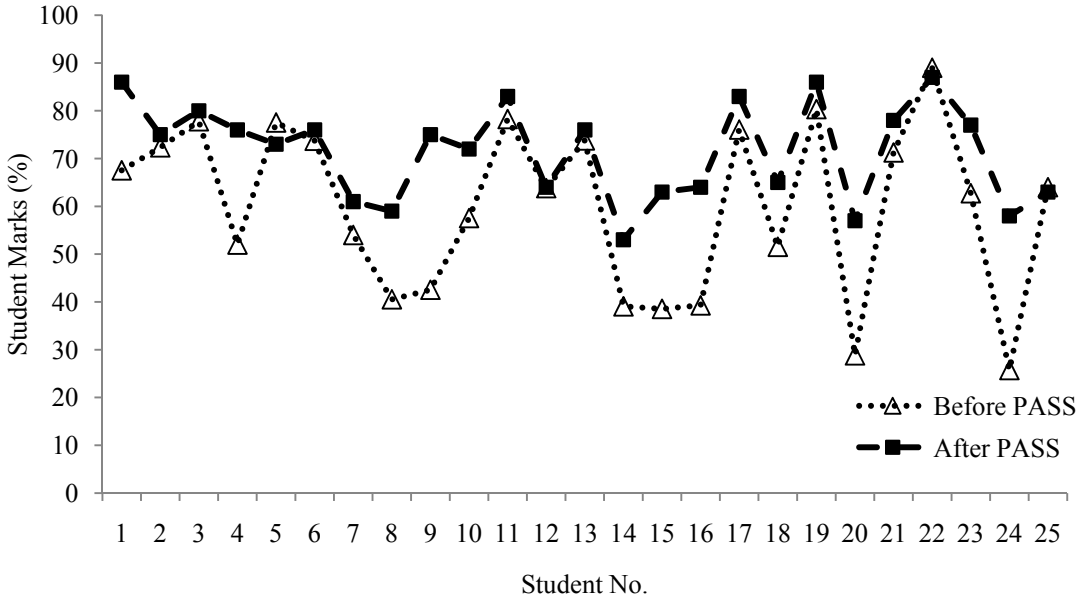

Figure 1: Comparison of students' results before and after attending PASS program for Statics module.

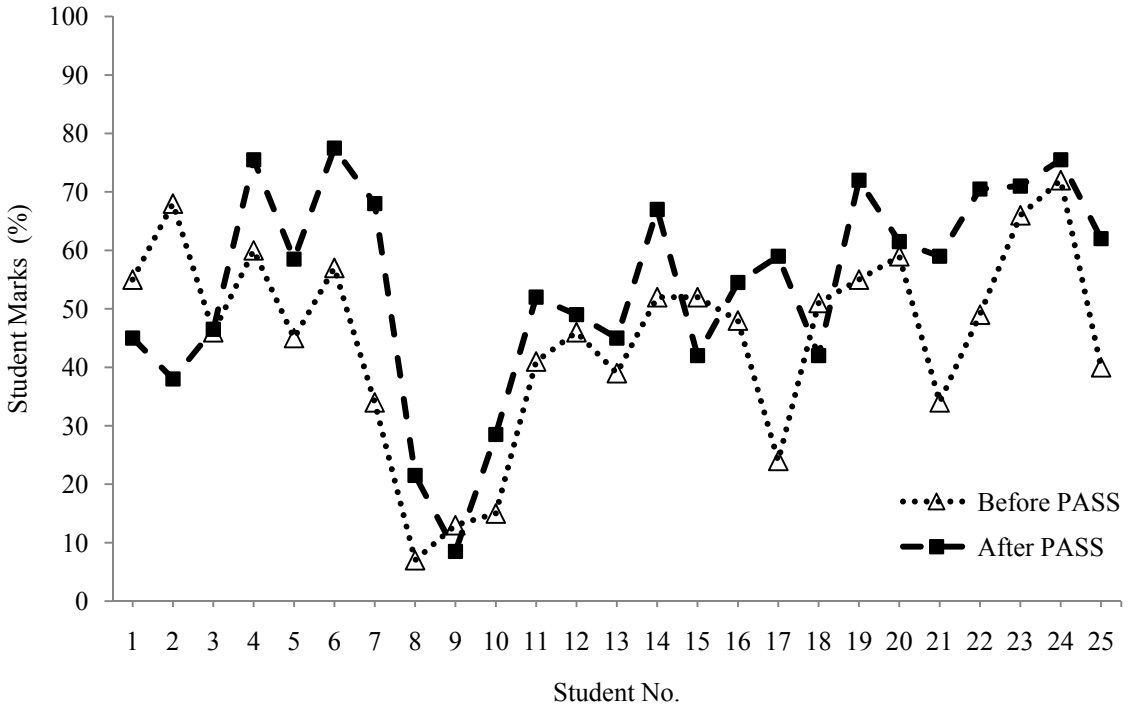

Figure 2: Comparison of students' results before and after attending PASS program for Fluid Mechanics module.

Tables 5 to 8 deal with subjective evaluation and assessed the PASS program from the students' point of view. In Table 5, students answered 10 provided questions using a rating scale from one to five. One and five were standing for strongly disagree to strongly agree, respectively. Questions were constructed in such a way that a high rate showed positive feedback about the corresponding aspect of the question while a low rate highlighted a shortcoming. Ratings were generally around 4 and above, the two questions that were rated lower than the others related to the effect of PASS program in their time management (3.12) also ability to work as a team (2.94).

Table 6 presents students' answers to the question regarding what they liked most about the PASS program. Answers were focused around a similar point; they felt relaxed and they could freely discuss with their facilitators without formal boundaries that might have existed between them and the lecturers. Also seniors were able to share their own experience and answer the questions patiently. Table 7 displays the effect of PASS in the students' learning process. Answers emphasized that classes gave them an opportunity to think and resolve problems in a different way. They started from basics and then solved problems step by step with the help of the facilitator who shared their ideas and experiences. Attendees' opinions about the possible improvements in the program are mentioned in Table 8. It can be seen that they were generally satisfied with the program, although some of them expected classes to start earlier so more sessions could be available during a semester.

Table 5: Descriptive Statistics: rating from 1 to 5; 1: Strongly disagree; 5: Strongly agree.

Sentences that complete "PASS program:"	Minimum	Maximum	Mean	Std. Deviation
Improved my understanding of the content of the subject	2	5	4.42	0.87
Helped me to succeed academically in this subject	3	5	4.47	0.72
Encouraged me to take responsibility of my own learning	1	5	3.82	1.07
Helped me to manage my study time more effectively	1	5	3.12	1.11

Improved my ability to work as a team	1	5	2.94	1.20
Encouraged me to ask questions	1	5	4.29	1.10
Increased my confidence to study this subject effectively	3	5	4.35	0.78
Increased motivation to complete this course	3	5	4.12	0.70
Improved my problem-solving and analytical skills	3	5	4.41	0.62
Provide me with feedback on my understanding of this subject	3	5	4.23	0.66

Table 6: Subjective evaluation of PASS sessions; quotations that complete the sentence "Based on the session which I attended, what I like MOST about the PASS program is".

Being able to ask questions
Discussion with Seniors
It is fun filled
Knowledgeable and friendly Seniors. They come to our aid gladly.
Have freedom and feel relaxed.
It is conducted by seniors whom are close to us, which enables us to ask questions freely.
I can ask my doubts for the whole session
I feel free to ask.
No stress
The seniors are friendly and it is pleasant to ask questions from them.
Knowledgeable and patient seniors, because I am a slow learner, and sometimes I might ask redundant questions.
I can understand better on the subject
We get to learn different things from our seniors.

DISCUSSIONS

Objective evaluations showed that students who in general attended more than 50% of the PASS sessions did not have difficulty in the final exam and were able to achieve grades A or B. This program was not compulsory so a high number of participation was not expected. Current thinking is that the first milestone is already been accomplished in this way and due to the outcomes; a greater number of students will believe and join PASS in the future.

Tables 3 and 4 presented that two parallel PASS classes were available for a module but a high number of students only attended one of them. Surprisingly students in either class missed more than half of the classes for the whole semester. Reason may be high number of students in the crowded class which naturally limits the student-facilitator interaction. Based on the plan, two PASS leaders were assigned for a group of 15 students thus this number should be restricted to 5 to 8 students (Coe *et al*. 1999). Leaders can be recruited from year 3 and year 4 students as Taylor's is going to start its own 4 years program. Being a PASS leader is voluntary but they also benefit in various ways. They review courses and improve their basis by teaching others, improve leadership and management proficiencies, enhance their CVs and of course earn some salary. For the class with a low number of attendees, lack of experience or techniques of PASS leaders can be one of the reasons, and this is needed to be improved for the future. Generally speaking PASS leaders require training in ways to initiate discussions and encourage active participation of students.

Subjective evaluations said that students liked the PASS program. It is like a discussion channel that students attend without any conventional barrier that they normally have with tutors and lecturers. Table 6 indicated that it is a huge concern for students to ask and answer questions in a relaxed environment without any pressure and there is no consequence if they are right or wrong. Other studies (Coe *et al*. 1999) suggest that PASS leaders dynamically join registration week and orientation activities to be closer to students. PASS can help students to study in groups and learn through discussions and brainstorming. Group working was one of shortcomings as addressed in Table 5. Leaders needed to split students into small groups and encourage them to argue with each other. They can also help students to manage study time by sharing their own approach and experiences. Other feedback suggested having more PASS sessions or starting them earlier. For this purpose, it is crucial to allocate and manage PASS for high risk courses prior to the beginning of any semester. So the program will run parallel to lecture and tutorials as the semester starts and students will benefit even more by their participation.

Table 7: Subjective evaluation of PASS sessions; answers for the question "How did PASS assist your learning in this subject?".

Help me to understand more
Encourage me to think
After PASS learning session I recapped with what I missed in the lecture, which enables me to make a A in the final semester.
Gave me examples, tips and guidance
Teach us from the basic
To solve harder question in another way
We are given some questions to be solved, after some time; they will solve it for us so we know where we did wrong. They also show what kind of common mistakes I make.
By doing the questions, improves my skills
Improve the understanding of the subject
A different technique to solve a question (what seniors taught us might be different from what our lecturers taught us).

Table 8: Subjective evaluation of PASS sessions; answers for the question "In your opinion, how could the PASS program be improved?".

Use Powerpoint to explain problem
Very good
Satisfactory
Start pass session earlier in the semester
More pass sessions
I am not looking for improvement, maintaining the current standards are good enough.
I think so far the pass program is good

CONCLUSIONS

The PASS program was conducted successfully for Statics and Fluid Mechanics modules in the School of Engineering. Objective appraisal was established on statistical analyses of students' marks and attendances whereas subjective evaluation focused on the students' points of view. Results showed that those who generally attended equal or higher than 50% of classes achieved good final exam results. None of the PASS attendees failed Statics also 78% of those who achieved grade C+ or below in Fluid Mechanics they were only present at less or equal to 50% of the PASS classes. Comparison between results before and after conducting the program showed a common enhancement in students' accomplishments. Feedback indicated that they were very happy with the new environment that was introduced in their learning process. Attendees were able to participate in discussions and ask questions in a relaxed situation. Team work was one of the short comings and this requires to be more practiced and encouraged by the PASS leaders. They also need to describe how to manage study time by sharing their own experiences with students. Another request was to conduct more PASS classes during the semester. So in future, high risk modules may be defined beforehand and PASS programs could be started parallel to the conventional lecture and tutorial sessions every week.

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