

NATIONAL PASS DAY CONFERENCE PAPER.

“PASS: PRIMED, PERSISTENT, PERVASIVE”

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PRIMED.

The Problem.

My journey with Peer Assisted Study Sessions, or Supplemental Instruction (SI), began in 1993 when I took over a 1st year, 1st semester course in QUT's Bachelor of Engineering program.

The course had 400 enrolments with students from all 10 engineering majors at QUT. The 400 students used to be broken up into 6 groups and each group would receive a 2 hour lecture per week – that is, 12 hours of lectures were being delivered each week. Each student was also expected to attend a 1 hour per week tutorial, usually run by academic staff or postgraduate students.

The course covered basic mechanics, which comprises a challenging set of topics on how forces interact with various bodies. One normally expects 1st year students to find it difficult to come to grips with the material. However, when I ran that course in 1993, the failure rate was 55%! I investigated with the lecturer who used to run the course and found that this was normal. The result in 1993 was that I was pressured to substantially lower the passing mark for the course so that the failure rate appeared to be 30% which was acceptable to examination review meetings.

In a subsequent strongly related course in 2nd semester 1st year, in which I was involved as a tutor, I found that for the students whose failing grades had been manipulated in the first course to allow them through, 90% of them failed the 2nd course.

The situation was intolerable. So, for 1994 I reconstructed the whole course.

I saw that the students were getting 2 hours of passive lectures in which only material from the set text book was being covered. Also, students were ending up with a poor set of notes from those lectures due to distractions, boredom, inefficient note taking, etc. They were relying on those terribly deficient notes to study for exams, rather than using the text book, because they erroneously thought their notes were a good indication of what would be required for the exams.

So, I wrote a comprehensive (90 page) study guide, which was simply a guide to where to find the appropriate material in the text book, together with supplementary explanatory material, worked examples, and activities they could do to help understand the text book content. With the study guide and text book, there was no need for me to spend hours “teaching” them the technical content. Instead the lecture was reduced to 1 hour and focused on those concepts that I

knew they found tricky. As well, all 400 students in 1994 received that 1 hour lecture together, cutting out 11 hours of expensive lecturing.

This also allowed me to afford to have each student attend 2 hours of tutorials a week. I believed it was important to minimise passive learning (lectures) and maximize active learning (tutorials). I also began developing some computer based education tools to help further with active learning.

What was the net result of all this work? Well, at the end of 1st semester 1994, the failure rate was 50%! On investigation, I found that students were attending at best only 1 hour a week of tutorials and so they were not giving themselves enough time to get help in understanding the material.

PASS Arrives

I realised that I needed to find an alternative form of active learning to help students use that 2nd tutorial hour effectively. They needed a variety of learning experiences, and especially needed one that would help them come to grips with difficult concepts. I knew the resource-based approach I'd taken with the study guide and CBE modules was the right thing to do, so I continued with them in 1995.

The first PASS program was instituted at QUT in a 1st year course in the Nursing degree in 1992. PASS led to a drop in the failure rate in that course from 20% beforehand to 5% afterwards. This seemed to be just the trick for my difficult engineering course.

So, I appointed 26 2nd year PASS leaders in February 1995, got them all to attend a full day's training run by two experienced PASS trainers, and appointed as a PASS supervisor a tutor I knew was empathetic to the ideals of PASS. There were 13 PASS sessions per week in 1995, with 2 leaders running each session. Because of 13 sessions running each week for 13 weeks, each leader was observed by the supervisor only twice in the semester.

What was the result of this exciting innovation, on top of the previously developed resources also available to the students? Well at the end of 1st semester 1995, the failure rate was still 45%! You can imagine that it was very disheartening. Two years of hard work and not much to show for it. As well, there were grumblings in the School because I'd gone out on a limb to make all these changes without clear result. The traditionalists who had been running the course were critical and pressing for a return to "the good old days". They were particularly unhappy about my use of "unqualified" 2nd year students to "teach" the 1st years, as they put it.

PASS Is Modified

Lots of thinking led me to realise that the PASS leaders were trying their best but were slipping into a leader-centred passive-student mode of running the sessions. The twice-per-semester drop-in by the staff supervisor just wasn't enough to keep the leaders behaving as facilitators and not as teachers. As well, the training day needed work – the trainers I used spent the whole day talking to the new leaders about what PASS was, how to be a facilitator, etc, but never gave the leaders a chance to practice being a facilitator and to get immediate feedback.

I realised that much closer supervision of the leaders was needed, week by week, as well as a much more active training day. So in 1996 I selected 5 of the 1995 leaders who I and the staff supervisor felt were committed, bright and empathetic, and appointed them as supervisors; in 1996 these new supervisors were in the 3rd year of their Bachelor of Engineering degree. Their wages were set at 50% more than a leader's wages to acknowledge the responsibility and extra work they were expected to carry. To pay for these wages, I reduced the number of leaders in each session to 1. I noted in 1995 that with 2 leaders per session, one would usually dominate.

Each supervisor was given 3 leaders to care for. Their duties were and continue to be to:

- contribute to the training of the new leaders on the training day;
- spend time in each leader's session each week;
- gather together the rolls of student attendances at PASS sessions;
- meet weekly with their 3 leaders all together to review the week's sessions, swap ideas, plan the next week's sessions, and help the leaders network with each other;
- meet weekly with me to review and plan and network amongst the supervisors.

I also revamped the training of the leaders. Half of the training day was set aside for the new leaders to practise their new facilitation skills in front of a critical but friendly audience. As well I instigated a re-training day half way through the semester which, via a question and answer approach, allowed the leaders and supervisors to raise good and bad experiences, what worked and what didn't, how to handle difficult situations, and so on.

So, what was the net result of all this work? The failure rate suddenly dropped to just 25%! At last, the system was working. I always believed that focusing effort on maximizing the learning experiences and learning resources for students was better than maximising lecturing, and finally, there was the result!

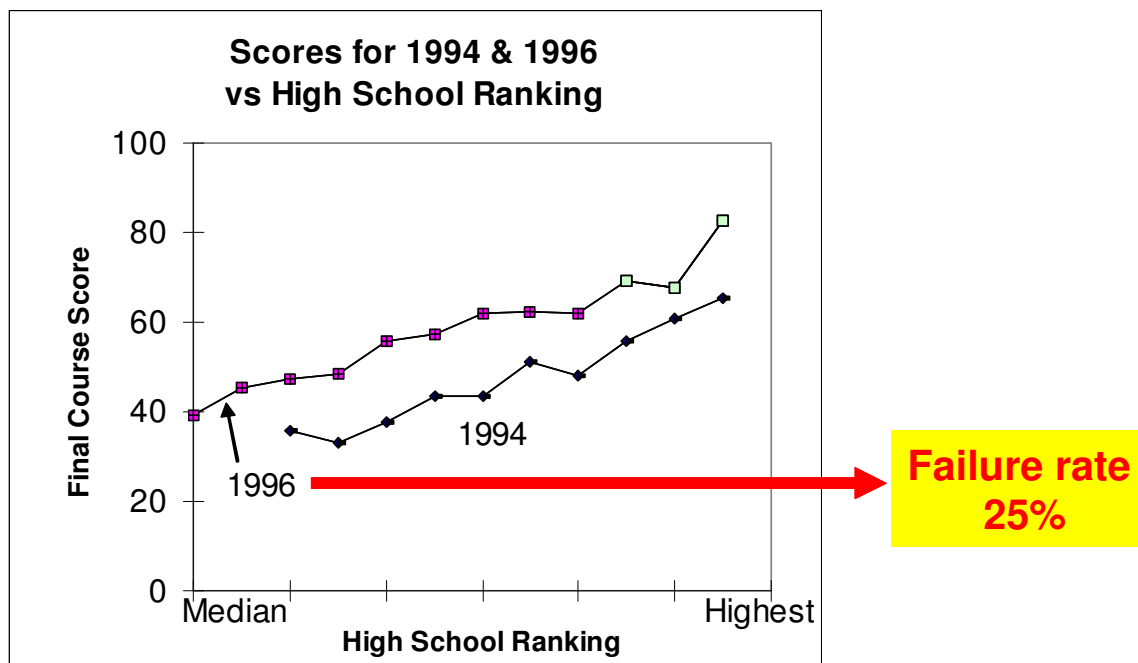


Figure 1 – Effect of Changes to PASS on Failure Rate

Figure 1 shows the effect of the changes to PASS, by comparing the final course marks from 1994 before PASS was incorporated, with those from 1996 after PASS was modified to include close supervision and leader-centred training. On the horizontal axis in Figure 1 is the high school rank the students received when in high school the previous year. In Queensland students receive an OP score – a score of 1 is highest, a score of 25 is lowest. Figure 1 takes all the students who received a given OP score (between OP 1 and OP 12, which was the cutoff in those days for admission to an engineering degree), and averages the final mark those students got in the course, and plots that average final mark as a point on the graph.

It's clear from Figure 1 that a substantial and sudden improvement had occurred with the students' marks in the course in 1996. I was careful to make sure that none of the style or form of assessment altered over the years in which the changes were made to the course, so the improvement in marks is real. For the first time in a long time, there was no need to massage the pass mark for these students – they had genuinely passed the assessment.

Figure 2 shows that the improvement kept getting better - in 1998 the failure rate dropped below 20%. In subsequent years, the failure rate has bounced around between 20% and 25%. However, in 2006, probably due to PASS-related factors to be explained a little later in this paper, the failure rate dropped to just 10%. The content and assessment of the course is not much different from 1993 when this journey began, but what a difference has been made for the students in that time!

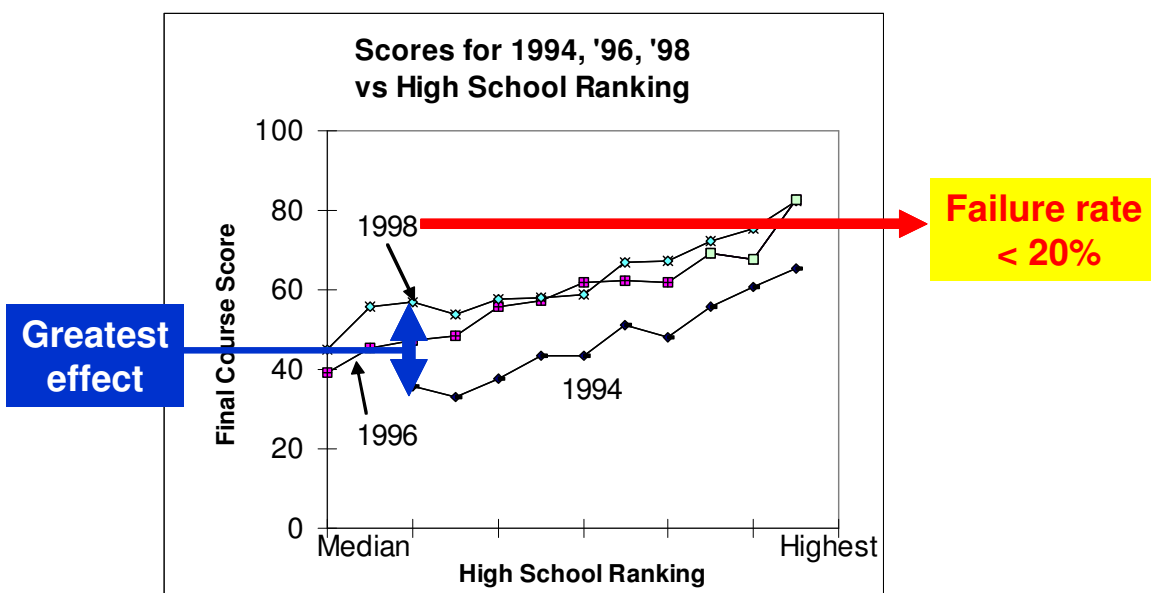


Figure 2 – Persistent Effect of Changes to PASS on Failure Rate

Figures 1 and 2 show that students from ALL high school ranks benefited greatly. The brighter students certainly improved because they learned more by “teaching” their less capable colleagues. The latter experienced the greatest improvement in Figure 2 because they were learning both in and out of the PASS sessions from their brighter colleagues in a closely networked friendly atmosphere.

One other bit of data that's worth pointing out is shown in Table 1. It arose from surveys I conducted of students each year, asking them to nominate the single factor that they felt most contributed to their learning in the course. Most of the students found most of the components in the course helpful, but the table shows what they nominated as the single MOST helpful. The PASS scheme was clearly very popular.

Table 1 – Attraction of PASS to Students

Component in Mechanics Course	Percentage of students nominating as single <i>Most</i> useful component
PASS Scheme	53%
Lecture	22%
Text book	16%
Study Guide	13%
Tutorials	9%

PERSISTENT.*Funding.*

Unless a PASS scheme compensates leaders for their work by gaining credit in their studies, then it's going to cost precious faculty funds. Funding can always dry up so PASS schemes are usually continually under threat of being shut down by budget controllers who need convincing of the value of PASS. For example, at QUT there have been upwards of 20 separate PASS schemes commenced since 1992, but only 2 remain. The rest were killed off by the drying up of funds. Table 2 illustrates some of those schemes and their life span.

Table 2 – Fragility of PASS Schemes

Discipline	Students enrolled	Duration & Current Status
Public Health	80	2 years, no more
Media & Journalism	60	2 years, no more
Education	300	2 years, no more
Electrical Engineering	200	2 years, no more
Indigenous Unit	50	3 years, no more
Law	100	3 years, no more
Psychology	80	4 years, no more
Life Science	400	5 years, no more
Architecture	200	6 years, no more
Information Technology	500	10 years, still operating
Engineering	400	12 years, still operating

Without a clear and ongoing funding mechanism, PASS schemes tend to have a short life. So, the objective is to assure one's funding. There are three sources of funds:

1. from within the budget for that course;
2. from a school/faculty/university commitment;
3. from outside sponsorship(s).

Option 1 above is the primary way in which the PASS scheme in engineering mechanics at QUT has been funded since its inception. Each year I've been able to convince the finance folk that without the scheme, not only would the students be worse off (pass/fail statistics are vital in this argument) but that the extra lectures and tutorials required in returning to a traditional mode of "teaching" would consume almost as much money as the present structure. However, to fund this way requires a course convenor to dramatically restructure their course to save money.

Option 2 above is the way in which QUT's Information Technology PASS program has kept going for 10 years. The Dean of that Faculty in 1996 was committed to student learning and for many years the money was available as a line item in the Faculty's budget. Despite recent severe cutbacks in that Faculty due to loss of student numbers choosing IT as a career (a global phenomenon), the PASS coordinators were able to convince the Faculty of the benefits of the scheme and it is continuing.

Option 3 is sometimes a practical way of raising funds. For 5 years I was able to get Exxon-Mobil to contribute \$5000 a year towards the costs of running the PASS program in engineering mechanics. Of that money, \$4000 helped in paying the salaries of the PASS leaders and supervisors, \$1000 was used to fund prizes.

The prizes comprised \$25 per student member of the PASS group that achieved the most improved marks across the three on-course assessments during the semester. Each prize recipient also received a certificate. The leader of that PASS group was awarded the cheap and dubious perennial "Daggy Teddy" award. The idea of the prizes was to give some impetus to the members of each PASS group to strive for higher performance.

Unfortunately the central administration of the Exxon-Mobil company changed its policy for promoting itself in undergraduate courses and that useful source of money ceased. Fortunately, as described above, I was able to convince the finance folk in my School to allow me to keep appointing PASS leaders and supervisors within the constraints of the course's budget.

Operational Issues.

Almost always, PASS schemes operate as an add-on to existing courses. PASS sessions are most often an optional extra that students are encouraged to attend. For these reasons, typically attendance rates at PASS are around 30% of the student body.

I realised that the benefits of PASS needed to be experienced by the full student body in my mechanics course. So, from the beginning I convinced the powers-that-be to have one hour of formal classes in the course to be PASS. That way the PASS sessions have been timetabled as an official part of the course and of students' formal classes.

This approach, on top of selling the scheme and its benefits to students each week in the lecture, has resulted in attendances being up around 95% in the first few weeks of semester, but never dropping below 70%, even in the latter part of semester. Through collecting attendance rolls each week, I was able to plot how many students attended how many sessions. Figure 3 shows the outcome – the shaded portion of the figure shows that around 70% of students attended at least 5 sessions throughout the semester. The peak attendances were for 7, 8 and 9 sessions.

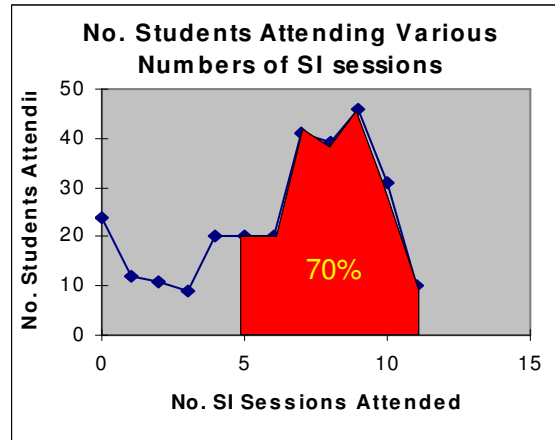


Figure 3 – Attendances At PASS Sessions

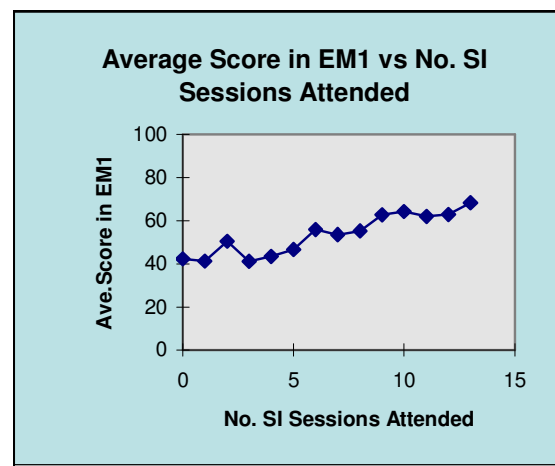


Figure 4 – Attendances At PASS vs Final Course Mark

Figure 4 shows how students' final assessment mark in the course improved the more sessions they attended. So, using formal timetabled classes got most students to attend most sessions, and therefore the final grade of most students improved. However, one matter I've constantly had to push each time that timetabling comes around is to have the PASS sessions at time slots when 2nd year students are also free, otherwise the whole thing would come to a crashing stop.

PERVASIVE.

The final step in making a PASS scheme truly successful is embedding it into the thinking of both the student body and the School or Faculty.

After a number of years of successfully running the PASS scheme in the mechanics course, I realised that there was a resource that I was ignoring but that could be very useful. Students who encountered PASS as a 1st year, became leaders in 2nd year, and then supervisors in 3rd year were more experienced and knowledgeable about the intricacies of PASS than I was, and could contribute much to the scheme.

So, from 2001 I selected a 4th year student each year who'd gone through all the stages of PASS participation/leadership/supervision and who stood out as a leader amongst supervisors in the previous year. The selected student was appointed "Supremo" of the PASS scheme for that year. The duties of the Supremo were and continue to be:

- organise the training day program in consultation with me;
- upgrade & prepare copies of the training manual for leaders and supervisors;
- run the training day (I'm always present as a back stop);
- meet weekly with the supervisors for review, feedback, support, etc;
- keep me informed regularly of issues, problems, etc;
- organise and run 3 "summit" meetings for all the leaders and supervisors together (these 3 summits replaced the retraining day);
- write a detailed report on how things could be improved next year.

The duties above were by and large what I was doing until 2001. Because of their experience and keenness to do a good job however, the 4th year Supremos have each year been able to do much better at the oversight of the PASS program than I was. So, the whole scheme is now run by students and is overseen by students for the sake of improving learning amongst students. This is peer mentoring and peer support at its best. The final structure of the mechanics course since 2001 is shown in Figure 5.

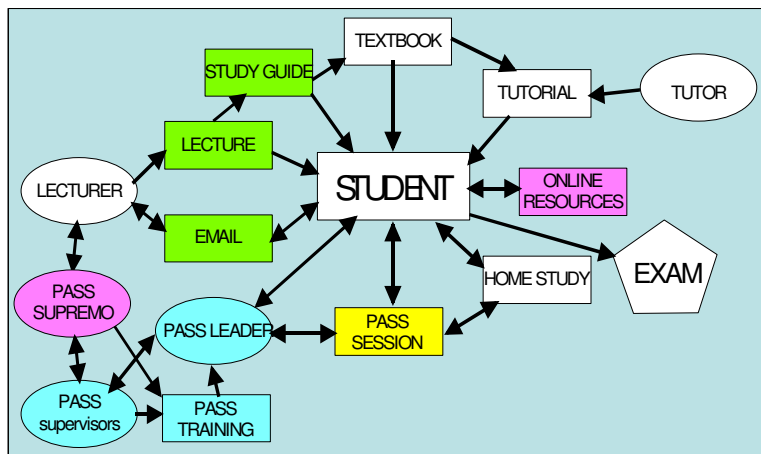


Figure 5 – Structure of Mechanics Course and PASS Scheme

The costs involved in running the scheme are not small, but in the mechanics course with 400 to 500 students, it can be absorbed. Table 3 shows the current costs for running the scheme in its present format for 500 students enrolled.

Table 3 – Cost of Current PASS Scheme for 500 Student Enrolments

1 Supremo	4 th year, experienced supervisor	\$1500
5 Supervisors	3 rd year, experienced leaders	\$550 ea
15 Leaders	2 nd year, selected from recommendations by old leaders	\$400 ea
<i>21 persons</i>	<i>Total cost =</i>	<i>\$10,250</i>

The scheme is now embedded into the thinking of the Faculty and School because of the extent of time it's been running, the tradition its built up, the very clear success it's achieved, and the recent realisation by QUT that peer mentoring of 1st year students is critically important.

I no longer teach the mechanics course, but was able to convince the incoming convenor/coordinator of the benefits of the structure I had built up over the years. He's been running the course for 3 or 4 years now, with me keeping a fatherly eye over the PASS scheme's operation. He's sure of the value of the scheme because this year the failure rate dropped to just 10%, which he believes is primarily due to a very good effort by the PASS leaders, supervisors and Supremo.

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