

# The impact of virtual mentoring on first year engineering students

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***Abstract:** Students' first year experience at university has been of concern for a long time. This is especially the case in engineering faculties where high rates of attrition occur during this period. Universities have used different strategies to stem this loss including student mentoring and various programs of learning and pastoral support. Many of these initiatives have been successful but questions remain about students' reactions to these approaches. The University of Newcastle has, over the years, implemented a range of projects to support students. This paper reports on the introduction of a guidance mentor (GM) in the Faculty of Engineering and Built Environment to monitor students' progress and to proactively offer support and direction to those experiencing difficulties. The GM program has operated for three years and has reduced the number of students being excluded from the Faculty.*

## Background

Since the 1970s there has been considerable research on student retention and attrition in higher education. The motivation for these investigations is not purely pedagogic - universities lose funding if they lose students. Much of the published research confirms the negative impacts of students withdrawing from university before they obtain their degree, evident both nationally (Krause, Hartley, James, & McInnis, 2005; McInnis, Hartley, Polesel, & Teese, 2000) and internationally (Tinto, 1999; Yorke, 2000).

Pitkethly and Prosser (2001) echo the concerns of McInnis, James and Hartley (2000) who observed that one third of all university students consider withdrawing in their first year of study. The work of McInnis et al is regarded as seminal and is still relevant as first year students, according to Krause (2005), vacillate between the three sometimes competing tensions of:

- the relevancy of the program they are enrolled in,
- perceptions of themselves as clients (from the marketing and service dimensions of their institution), and
- the disciplinary and academic integrity standards required by academics.

These arguably contribute to students withdrawing from university. Several models have been proposed to explain how student retention and attrition occurs and numerous approaches aimed at reducing attrition have been explored and implemented, especially for students in the first year of their university studies. Strategies that have been trialled include practices that incorporate student engagement, learning communities, and academic and social integration. These have been shown to have a positive impact on student retention (Tinto & Goodsell-Love, 1993; Zhao & Kuh, 2004).

The Bradley Review (Australian Government (2008) has recommended an urgent re-structure of higher education. The Review recommends that by 2020, 40% of those aged between 25 and 34 years will have attained a higher education qualification. For this target to be met, universities will need to include students from non-traditional backgrounds. This will only exacerbate the challenge facing higher education providers in Australia, and engineering disciplines in particular.

## The need

Our Faculty has for some time been concerned that a sizeable proportion of our students are not completing the first year of their studies. In broad terms students may choose to ‘withdraw’ from a course, they may fail a course and decide to leave, or they may wish to stay at university, but their results prevent them from progressing. In the latter instance, as a part of our University’s Review of Progress (ROP) process, students who experience difficulties with their studies are asked to provide reasons (or, in our university’s jargon, ‘show cause’) why they should be allowed to continue their studies. These are students who have failed half of their courses over a period of two consecutive semesters. An outcome of the ROP process may be that a student is excluded from the University for a period of 12 months.

A pilot survey highlighted that many first year students were either not aware of, or had not used the University’s support systems (e.g. learning support, counselling, subject specific support etc.). Alerting students to these facilities and encouraging them to use them was seen as a first step in thwarting attrition. To accomplish this, a system of identifying students who were experiencing difficulties was needed. If these students could be offered or directed to support quickly, the rates of withdrawals or failure should decrease. It would be the role of support personnel to provide these students with the guidance, tools and support they needed.

## The Guidance Mentor

In 2007, our Faculty created the position of ‘guidance mentor’ (GM) to support students at risk of failing the courses they were taking. Our initial experiences in this regard have been reported at an earlier AaeE conference (Williams and Sher, 2007). To recap, the GM is tasked with identifying students who are experiencing problems, and with offering them assistance. The role is part-time and allows the GM to track students’ progress and make contact with those who appear to be experiencing problems. Students are introduced to the GM on several occasions (including orientation, lectures and tutorials), and by different people (including program convenors, course coordinators, administrative staff and pastoral support staff). In addition, students are informed about the roles and responsibilities of the GM through dedicated learning management system webpages (our University uses Blackboard).

When a student fails an assessment item, or does not engage with Blackboard activities, the GM contacts the student (usually by email, infrequently by phone) noting the lack of progress the student is making. The GM asks the student a range of questions, including:

- whether the student is having a particular problem?
- if the student needs extra support from a tutor?
- if the student needs to discuss their choice of career with a program officer or with ‘Careers Services’?

Where appropriate students are encouraged to:

- obtain support from University ‘Student Support Services’
- talk to a councillor
- meet with course coordinators and / or program convenors

The GM is responsible for:

- monitoring students’ progress. The marks students obtain for their assessment items are recorded in each Blackboard Gradebook (a facility which stores the marks for each assessment item for the course students are enrolled in).
- monitoring students online engagement. Blackboard statistics also allow the GM to identify how often students have accessed Blackboard and which options they have selected

- contacting students who have failed an assessment item or not participated in an on-line activity
- maintaining subsequent and regular contact with ‘at risk’ students
- tracking these students across all the courses they are enrolled in
- liaising with course coordinators and alerting them to problems their students are experiencing
- keeping records of what has occurred
- analysing records and providing feedback about trends to the Faculty and Program Convenors
- identifying best practice to support students during their first year at university
- facilitating student-staff relationships
- raising the visibility of ‘at risk’ or failing students

## Summary of activities in Semester One, 2009

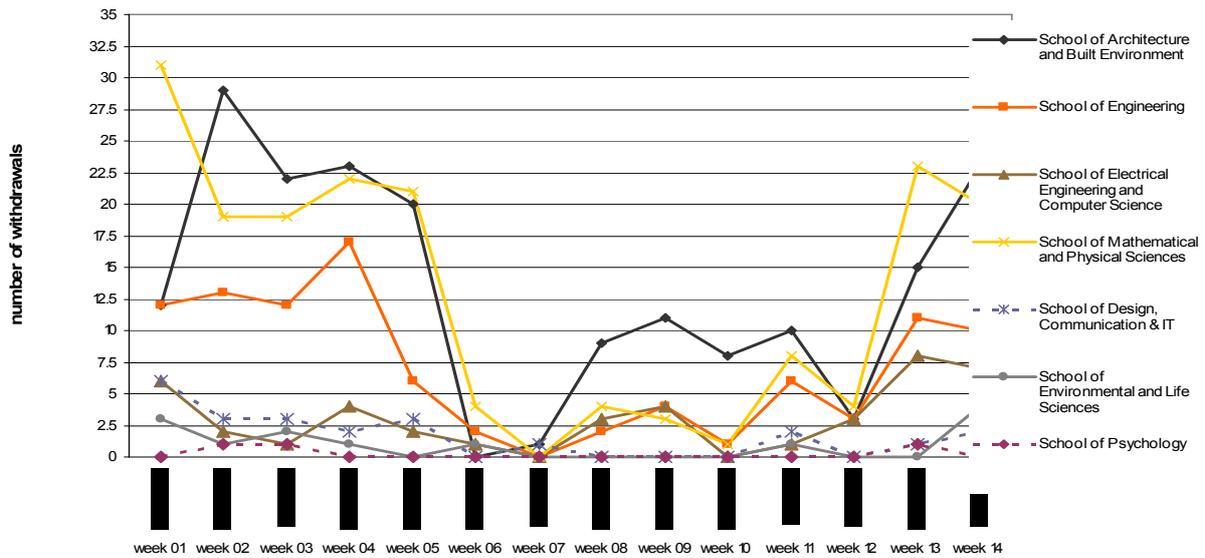
This section provides a summary of the activities of our GM during Semester One, 2009.

- Students in ten first year courses were monitored, 805 new students. These were spread across all degree programs offered in our Faculty.
- 367 students were contacted, 74 responded (It should be noted that some contacts did not require a response, especially the ‘introduction or welcome’).
- The average number of times a student was contacted was twice. The majority of contacts were once only. A minority of students (those ‘at risk’ and engaged in the ‘show cause’ process) were contacted more than six times.
- 38 students had ongoing contact (i.e. >3 times). Their difficulties included:
  - work commitments (there were the most common –approx. 70%)
  - academic difficulties
  - health problems
  - didn't like the program they were enrolled in
  - personal problems
- Every student was grateful for being contacted and given a chance to respond.

During this period the GM also tracked when students ‘withdrew’ from courses. Figure 1, shows the weeks in which this activity occurred. Whilst most withdrawals occur early in the semester, it is interesting to note that the HECs census date (week 5) does not appear to have a marked influence on the withdrawal rate. The frequency of withdrawals clearly accelerates towards the end of the semester, and the cut-off date for withdrawing without having a ‘fail’ recorded on a marks transcript.

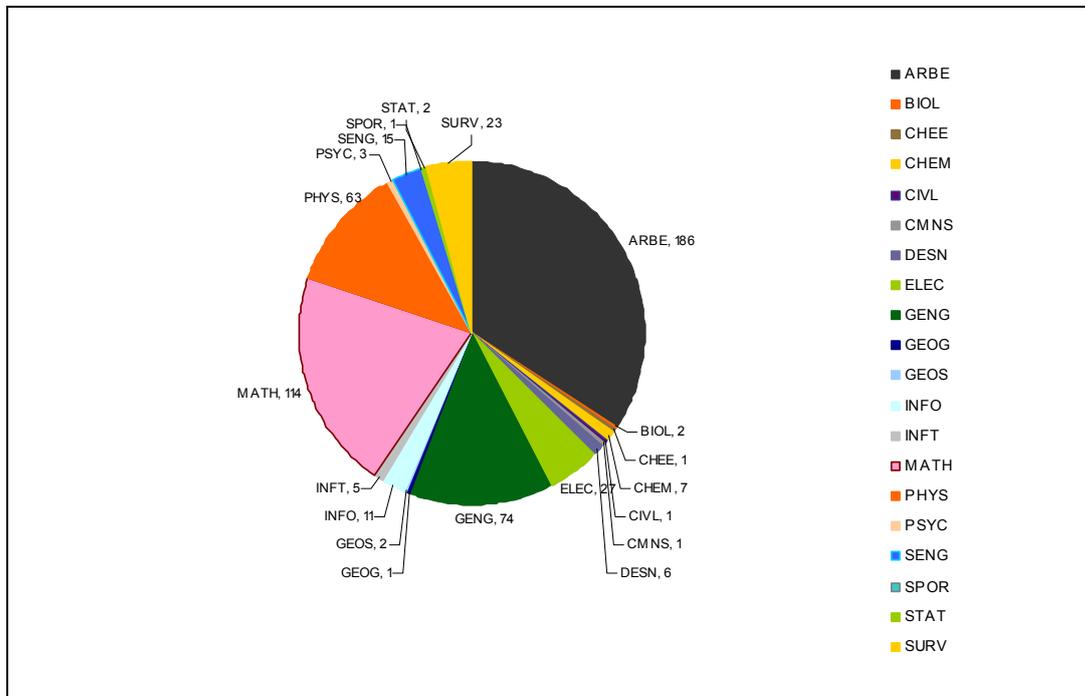
Figure 1 shows that mathematics and physics courses cause engineering students withdraw from most frequently. This trend is, unfortunately, not surprising or uncommon. Our Faculty, like most engineering faculties, is concerned about this and has embarked on several initiatives including a High School Bonus points scheme (to attract students to complete mathematics courses at the requisite level whilst at school), online mathematics diagnostics tests, and a review of all mathematics courses.

Figure 1 also shows that construction management students withdraw at a concerning rate (Construction management is one of the degrees offered in our School of Architecture and Built Environment). This program is delivered simultaneously to on-campus and distance-learning students. Many of the distance-learners are mature aged students who are working full time. Their difficulties in managing their time are well known in the domain and partially explain the trends shown in Figure 1. Surveys have shown that these students are, in the main, unaware of the support services available to them and this exacerbates the challenges they face.



**Figure 1: First year student withdrawals by School in 2009**

Figure 2 provides details of the courses students have withdrawn from. These are not evenly distributed between the Schools in the Faculty of Engineering and Built Environment. The Faculty is comprised of the School of Engineering, the School of Electrical Engineering and Computer Science and the School of Architecture and Built Environment (Other Schools noted in Figure 1 provide service teaching to the Faculty). The School of Electrical Engineering and Computer Science has an equivalent full time student load (EFTSL) of 450, the School of Engineering 715 EFTSL and the School of Architecture and Built Environment 750 EFTSL. Although ARBE (Architecture and Built Environment) courses account for 186 out of 545 withdrawals (or 34%), students in this School represent 39% of the Faculty’s total.



**Figure 2: First year student withdrawals by course / subject in 2009**

## Challenges experienced

Some of the challenges experienced in developing processes and procedures include the following:

- Service courses, delivered by Faculties, other than the Engineering and Built Environment do not use Blackboard. This applies in particular to mathematics and physics courses. The GM has had to liaise closely with staff responsible for these courses.
- Some lecturers have been hesitant to allow the GM access to their Blackboard site.
- Three different GMs have been employed during the three years the scheme has operated. This has limited the extent to which incumbents could build on their past experiences. We are optimistic that the present GM will continue for the foreseeable future.
- Extracting student data from our student records system has, at times, been difficult.

## Changes for Semester Two, 2009

In the coming semester there are a number of enhancements of the role of the GM, firstly as the GM becomes more familiar with Blackboard, more comprehensive use of the system will be made, this may include the use of the statistics function of the system to see the engagement of students with the online system. Secondly this coming semester extensive use of the 'early warning system' is anticipated.

The Faculty is to pilot a new University-wide project called Connect 2 Success (2009). This program is “voluntary and helps students look at what might be interfering with their academic performance and then suggests avenues of support and provides advice on overcoming the identified performance hurdles”

## Evaluation

It is difficult to establish to full impact of the initiative as the data is difficult to isolate because of the complexity of students enrolment and the diversity of options available to students. Some ‘Show Cause’ data is shown in Table 1. This shows that the number of “Show Cause” students has stayed relatively constant during the period 2006 to 2008. Since the GM project started in 2007, there has been a significant improvement in the representation of first year students in this group. This shows that first year students must be better informed and being strategic in how to avoid being classified as an at risk student. The only factor which has changed in the programmes is the GM initiative so it is appropriate to attribute some of the success in reducing the number of first year students in the at risk group. What appears to be evident is that students in the senior years are not being as strategic and there may be the need to broaden the role of the GM into subsequent years.

Year	Number of ‘Show Cause’ students	Number of first year students
2006	57	21
2007	42	5
2008	50	8

Table 1: “Show Cause” students

## Conclusion

The attrition rate among engineering students in the first year of their university experience is unsatisfactorily high. Dropping out of a course or a program has a significant effect on students as well as the Faculty. The impact on the faculty occurs at a number of levels, firstly is the impact of this attrition upon academic workload student failures and subsequent penalties incur workload on academics with academics required to set extra work or redress previous marking. Secondly the loss of income to the Faculty has implications both currently and future, lost students are a long term funding loss.

We believe that eliminating this attrition will continue to be a complex and difficult task that will involve a multiplicity of strategies. It is also our belief that the GM initiative represents the start of this process and with further refinement of the role and the development of better systems to support the GM role that the impact of the GM will be enhanced.

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