Diversity in student initial reactions to a Professional Engagement Program

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Introduction

The introduction of a new professional engagement program (PEP) in the Faculty of Engineering at The University of Sydney was previously reported (Kadi & Lowe, 2018). The program aims to assist students to deeply understand the professional and social contexts in which engineering knowledge can be applied and how these contexts shape the application of their knowledge. In undertaking the program students are required to undertake a wide range of professional engagement activities throughout the entire duration of their degree. Students log activity claims in an online system, along with student reflections and mapping to professional competencies. These claims are assessed by staff and/or peers based on business rules and clear assessment rubrics. A series of 2 hour face to face workshops, attended once or twice each semester, guide students through the process and help keep them engaged and on-track. The students' overall development is broken into a series of three stages, each with different requirements relating to the nature of the activity.

At the time of writing 240 out of approximately 800 students in the first cohort have now completed stage 1 of the program, representing around 40% of the students still enrolled in an engineering degree program after 1.5 years. In order to better understand how students are responding to the program, and potentially where there are differing reactions that may affect the value of the program to them the students who have completed stage 1 were surveyed to determine their views about the new program. The survey was designed around the technology acceptance model (TAM) (Davis, 1989), widely used in user acceptance of technology systems, and which we have adopted for this study.

Adaptation of TAM for Survey Design

The technology acceptance model is shown in figure 1. We believe that this model can be used more broadly when considering how people react to the introduction of any new innovation, including new education programs.

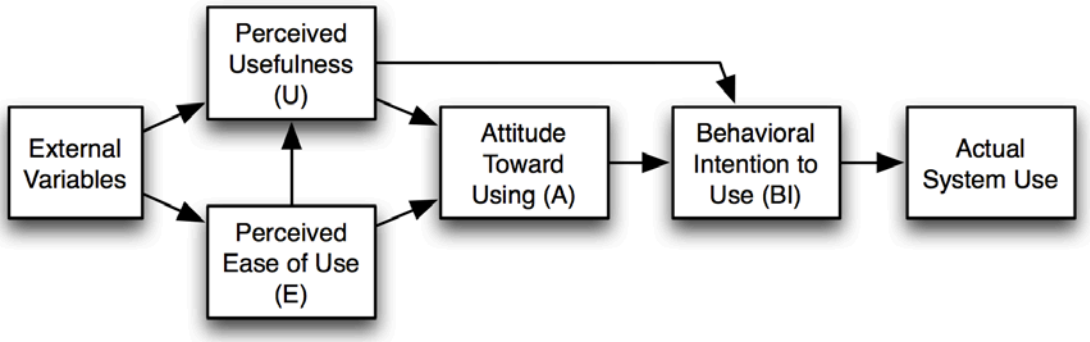

Figure 1: Technology Acceptance Model (from (Davis, Bagozzi, Warshaw, 1989))

Our student evaluation survey was designed with 3 main sections. The first section was designed to explore the extent to which students saw value in undertaking professional engagement as part of an undergraduate engineering degree. It also explored whether they

valued certain design features of the program in general terms, such as the need for professional engineers to develop peer review skills. To some extent, this is gauging student's perception of item (U) in figure 1, although students may not be able to easily discriminate between professional engagement in general and how it is implemented within this specific program. The questions in section 1 were specifically worded to try and elicit the former, whereas the latter was explored in subsequent sections of the survey.

The second part of the survey was designed to investigate external variables such as time constraints of students and issues such as timetabling. The third part of the survey aimed to explore students' specific reactions to PEP using the items marked (E), (U), (A) and (BI) in Figure 1 as a basis for the exploration – that is, how do students perceive various elements of the program and how does this influence engagement in it?

Survey Questions and Results

The survey response rate was just over 10% of the students who had completed stage 1 of the program. We acknowledge that this potentially results in a significant risk of selection bias (i.e. those choosing to respond may hold a particular view of the program that is not well correlated with the majority) and this needs to be taken into account in our interpretation of the results. The survey invitation was emailed during the first few weeks of semester 2 when students are already beginning assessment work for their various units of study.

Section 1: Perceived value of the program and its elements

Figure 2 shows that, in general, a significant majority of students who responded value professional engagement, recognise that doing it early in their degree has potential benefits and that regular, ongoing professional development is good preparation for a lifelong career of continuing professional development. Note that in the following figures, "A+" indicates strongly agree, "A" agree, "A-" somewhat agree, "N" Neutral, "D-" somewhat disagree, "D" disagree and "D+" strongly disagree.

Figure 2: Responses to Questions 1-3

Figure 3 indicates that most students agree that peer review is a key skill for professionals to develop, but not as many students are convinced that tracking competency development is beneficial during development and can be used as evidence for seeking employment down the track.

Figure 3: Responses to Questions 4-6

Figure 4 shows that views on reflection are quite diverse despite (or possibly because of) this being actively required as a component of the students Engineering studies. It is worth noting that this is listed as a 'learning habit of mind' by the Royal Academy of Engineering (Lucas, Hanson, Claxton, 2014).

Figure 4: Responses to Question 7

Section 2: External Factors

Figure 5 shows results for surveyed external factors. In general, most students felt that time pressure from other units of study and from working outside of their studies made it difficult to find time to engage in the program. Timetabling was also perceived as a challenge by some students.

Figure 5: Responses to Questions 8-10

Other external factors mentioned in free-form questions were participation in club activities (though it is unclear as to why students perceived this as an external factor as these activities can be claimed as professional engagement) and employment.

Section 3 – Factors driving engagement (or lack thereof) in the program

Figure 6 shows respondent's views on the time requirement for the program. Most students felt that the program required too much time. A little over half of the students felt that one or 2 two-hour workshops per semester was about right, with the remainder feeling that this was too much, though to varying extents.

In Figure 6a, "Hr+++" indicates "way too much", "Hr++" indicates "too much"; "Hr+" indicates "somewhat too much", "OK" indicates "about right", "Hr-" indicates "somewhat too few", "Hr--" indicates "too few", and "Hr---" indicates "way too few hours". For Figure 6b, the question asked about whether the number of workshops was not enough (i.e. W+++, W++, and W+ indicating more workshops were desired) or too many (W-, W--, and W--- indicating fewer workshops were desired).

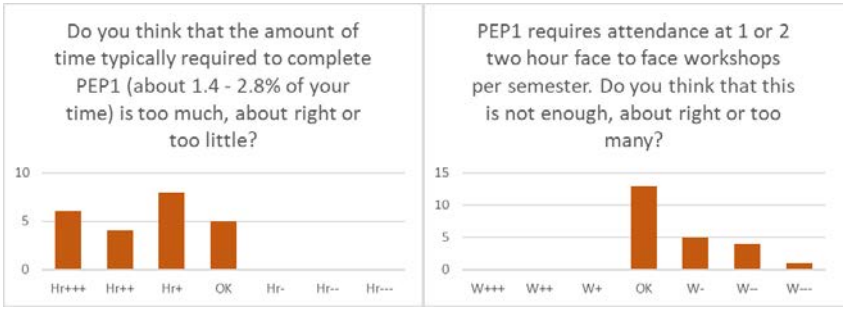

Figure 6: Responses to Questions 11 and 12

Figure 7 indicates views about the aims of the program and whether students could see connections between activities and the aims of the program. It also indicates students were mostly aware of help that was available in the form of a weekly drop in session.

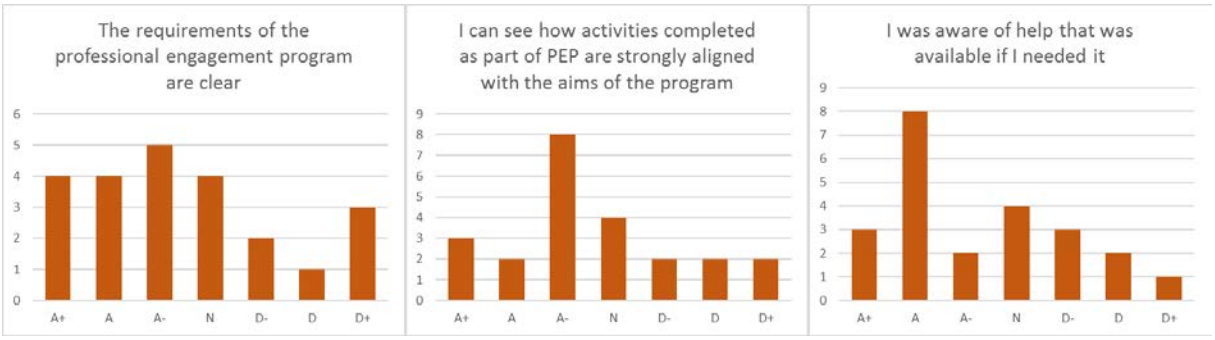

Figure 7: Responses to Questions 13-15

Somewhat to our surprise (given the efforts undertaken within the program to explain these areas), as shown in Figure 8, shows that a majority of students have not perceived any benefit from reflecting on activities, nor from peer reviews and only marginally beneficial from tracking competency development over time. This is in contrast to what the literature tells us are important outcomes for professional engineering degree programs. For instance, Shuman, Besterfield-Sacre and McGourty state:

> *"… the attributes of lifelong learning … include the ability to:*
>
> - *Reflect on one's own understanding" (Shuman, Besterfield-Sacre and McGourty, 2005"*

Ryan, Toohey and Hughes state:

> *"The kinds of outcomes that educators hope to achieve through the practicum …:*
>
> - *progressively develop competencies through participation in a range of practical experiences;*
> - *evaluate progress and identify areas where further personal and professional development is needed." (Ryan, Toohey & Hughes, 1996)*

Figure 8: Responses to Questions 16-18

Figure 9 shows results from 3 final and key questions from the survey. A majority of students perceive that completion of stage 1 of PEP has not changed their approach to learning (although for some it has). It also shows that more students believe they have not completed activities as part of PEP that they would otherwise have not done. And finally, a small majority of students believe that they are meeting one of the overall aims of the program.

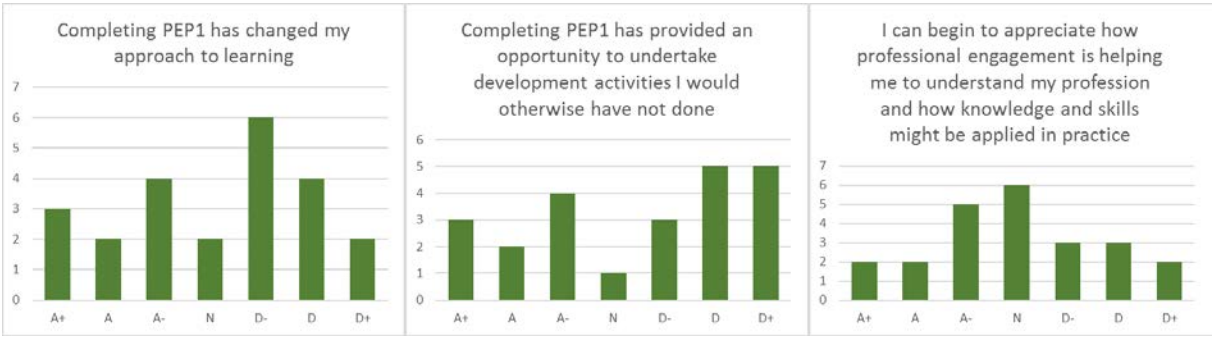

Figure 9: Responses to Questions 19-21

Free Text Responses

Free text response questions produced a wide variety of sentiments. The following demonstrate the breadth of reactions to the program:

> *"I think that reflection on professional development after an activity is absolutely crucial in getting the most out of that activity. Reflecting allows one to understand what skills/knowledge was gained from an activity and then look at how these may be useful in the future." [student 13]*

> *"I found that at the start of PEP1 I was very daunted by the task of completing and reflecting on 80 hours of activities. But after completing my first reflections and attending the review workshop I realised the benefit of the program, and I felt that I understood better how to seek out activities and write reflections. Overall I believe there is a great amount of information provided on possible activities, lots of resources helping students to write good reflections and lots of help available if needed." [student 13]*

> *"I think the active component of the program is great and having an incentive to complete more internships has been great and I love the experience I have been able to gain at such an early stage in my degree." [student 2b]*

> *"I think that PEP is the biggest waste of time I've ever been forced to be a part of. I strongly believe that if us students didn't have to waste so much time writing reviews that don't supplement any form of 'learning' from this unit and are completely subjective to the people 'approving' the hours, we would be able to focus on the actual important aspects of our degree, such as the classes that actually teach us how to become engineers." [student 12]*

Analysis and Conclusions

The final results shown in figure 9 are somewhat disappointing. A key rationale for the development of the PEP program was based on a recognition that the previous model – a 12-week placement late in the degree program – often had a transformative effect on students understanding of their discipline and that this, in turn, often led to changes in their approaches to learning in their Engineering course. We felt that, given this observation, there was value in engaging students with professional practice early in their degree when the resultant transformation of their understanding and learning approaches could have a greater impact. The above result indicating that students believe that PEP has not affected this transformation may result from one of several possibilities:

1. As commented early in the paper, there is a possible selection bias in our study. The views of the small sample of students who completed the survey may not be representative of the broader cohort, and may indeed have results from those who didn't see as much value in the program feeling a stronger need to express this.
2. Students' approach to learning may indeed have been positively impacted, but the students themselves were unable to recognise this change in themselves.
3. Some students do not yet, at an early stage of the degree, have sufficient experience (either generally, or specifically related to their discipline) to engage with the broader implications of understanding the nature of professional practice. As Bromme and Tillema state, "… professional knowledge evolves gradually in a process of enculturation of the professional within a working context which is in itself part of a certain culture." (Broome & Tillema, 1995)

Irrespective of which of these possibilities (or which combination) is likely, it is clear that further exploration of this area is important.

We believe that there may be other issues impacting on the perceived value of the program which include:

1. All 3 units of study in the professional engagement program are zero credit points. This may give the impression that the program is a 'bolt-on' to the degree program and may not be as important as other units due to it being zero credit points. Some survey responses made reference to this point.
2. There is always resistance to the introduction of anything new, particularly if it is compulsory. The first cohort will hear from students immediately ahead of them in the degree that this was not a requirement previously. The requirement to do any additional work, regardless of the perceived value, will be seen as unfair and 'extra' effort. There is evidence of this in figure 2 (which shows overall that student value the concept of professional engagement and some of its benefits) and figure 6 which shows that even a 1-2% increase in workload to realise those benefits is seen as excessive. The second main cohort of students in the program are showing strong signs of greater engagement and more overall acceptance.

It will be interesting to see the results of a similar survey when the second major cohort progress onto stage 2 and also whether there are any changes in attitudes of the first cohort once they move further into the program.

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