Peer observation of teaching:
Engineering new skills and collegiality

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Abstract: Academics in a school of engineering at the University of Wollongong participated in a peer observation of teaching pilot program using a partnership approach. All participants subsequently completed a questionnaire and were interviewed about the characteristics and effectiveness of the program. The average time spent by the academics participating was approximately 5 hours. Participants' evaluation of the program was overwhelmingly positive with outcomes including development of skills, ideas for teaching and giving feedback, and increased confidence. The development of collegiality within the peer observation partnership groups and the school was an especially strong outcome. All participants requested some kind of follow-up in the next semester or in the following year. Recommendations for similar programs in Engineering faculties and schools are provided.

Introduction

How do engineering academics learn to become good teachers? Most Australian universities now have courses in place for training early career staff in teaching. Yet an expansive Carnegie Foundation research project has concluded that at least in the United States, "undergraduate engineering education … is holding on to an approach to problem solving and knowledge acquisition that is consistent with practice that the profession has left behind" (Sheppard, Macatangay, Colby, & Sullivan, 2009, p. xxi). One professional development resource that is often overlooked in universities is the faculty members themselves. Engineering faculties are a repository of teaching experience, enthusiasm and concern for student learning, held to various degrees by different academics according to their experiences and orientation. Peer Observation Partnerships utilise collegiality and offer "a structured process for mutual support in which colleagues can share their knowledge and experience and develop their skills and approaches within the immediacy of their own teaching environment" ((Bell, 2005, p. 7).

While written reports by peer observers are being accepted as evidence for appraisal purposes in some universities, a peer observation partnership is not an appraisal activity. Rather it is "a collaborative, developmental activity in which professionals offer mutual support by observing each other teach; explaining and discussing what was observed; sharing ideas about teaching; gathering student feedback on teaching effectiveness; reflecting on understandings, feelings, actions and feedback; and trying out new ideas" (Bell, 2005, p. 8).

A review of peer observation in Australian universities (Bell, 2002) reported that some Australian universities were using peer observation of teaching in teaching courses for academics. More recently, a number of Australian universities have adopted peer observation of teaching in one form or another at faculty or departmental levels (Harris, Farrell, Bell, Devlin, & James, 2008). Increasingly, there is reference more broadly to peer review of teaching in human resources policies and some institutions have implemented systematic programs at institutional, faculty or departmental levels (Harris *et al*., 2008).

Evaluation of university teaching is often based on student feedback, yet peer review, through the process of peer observation, has the potential to provide valuable insights from an alternative perspective (Harris *et al* 2008, p5). The value of peer observation of teaching relates to: reassurance about effectiveness of practice; feedback on innovations; revealing hidden teaching behaviours; addressing known problems in teaching; learning from observation; developing conceptions of teaching; and development of collegiality (for example: Bell, 2001, 2005; Bernstein, Burnett, Goodburn, & Savory, 2006; Hammersley-Fletcher & Orsmond, 2004; Hatzipanagos & Lygo-Baker, 2006; McMahon, Barrett, & O'Neil, 2007; Peel, 2005).

There are few records of the use of peer observation of teaching specifically for professional development of engineering academics. One peer observation program for tutors in the engineering department of Nottingham Trent University has been explored by Solomonides and Swannell (1996, cited in Martin, 1998). The present paper describes a program of peer review of teaching that took place in the School of Mechanical, Materials and Mechatronic Engineering (MMM) at the University of Wollongong (UOW). The outcomes of the program evaluation are discussed and recommendations for engineering faculties and schools implementing peer observation of teaching are offered.

Evaluation methodology

Case study method seeks "explanation, clarification, confirmation, specification or contradiction" through "the study of the particularity and complexity of a single case" (Stake, 2000, p. xi) and "case studies are of value for refining theory and suggesting complexities for further investigation" (Stake, 2000, p. 448). In the present case the authors sought to understand ways in which engineering academics experienced peer observation and to evaluate the opportunities and outcomes of the program. It was hoped that the findings would inform further peer observation opportunities within the school and more broadly in other engineering faculties and schools.

A set of categories for evaluation was identified from the program aims and structure (Cohen *et al*, 2000, p. 152). A questionnaire and interview schedule were then developed. Quantitative and qualitative data were gathered from all 12 participants. Interview data was independently transcribed and classified under the pre-set categories.

The authors of this paper are the Head of School (PC) and the peer observation program coordinator (MB), respectively. The project evaluation was carried out by the coordinator.

The program outline

The Head of School (PC) decided to trial a voluntary peer observation of teaching program in the school. Key objectives were to: enhance the teaching capabilities of staff; to demonstrate to the student body that tangible steps were being taken to enhance their learning environment; and to use the program as a way to increase the level of collegiality within the school. A representative (MB) from the Centre for Educational Development and Interactive Resources (CEDIR) presented information about peer observation of teaching at a school committee meeting and then worked with the Head and Discipline Advisors to tailor a program to match the needs of the school (Table A).

Table A Peer observation partnership program outline

1. Preparatory workshop	All MMM staff were requested to attend a two hour workshop presented by the program coordinator
2. Initial Observation Sessions	A number of experienced MMM staff offered "Initial Observation Sessions" where they were observed in a lecture or tutorial and held a discussion session afterwards with the observers. 18 members of staff signed up to attend an observation session.
3. Partnership groups formed	Staff interested in taking part in a peer observation partnership confidentially emailed the coordinator with names of staff with whom they would like to work. The coordinator then formed four groups.
4. Planning meetings	Groups planned their observations with the support of the coordinator where requested. Participants were provided with the Peer Observation Partnerships in Higher Education manual (Bell, 2005).
5. Observations	Observations were carried out according to each group's plan.
6. Feedback meetings	Groups met for feedback and discussion (with the support of the coordinator where requested).
7. Evaluation	A post-program questionnaire and interview were administered by the coordinator.

Participation in the pilot program was voluntary except for the initial workshop and initial observation session, which all staff with a teaching role were strongly encouraged to attend. Of the School's 22

full-time teaching staff all attended the initial workshop (except two who were on leave), 18 signed up for the initial observations and 12 took part in the peer observation partnership program.

Findings

A very strong positive response to the program was reported by all participants who commented positively on various aspects of the development of skills and collegiality. Questionnaire data is summarised below and is discussed using interview comments as illustrative quotes.

Time spent in participation

Most participants observed a colleague teach once or twice, and were observed by one or two colleagues. All were involved in at least one preparation and one feedback discussion although one person reported having five discussions which may have been of an informal nature. As each observation session lasted approximately 1 hour and discussion sessions lasted between 1 – 2 hours, the time per participant spent above normal teaching load was on average approximately 5 hours.

Developing skills

Almost all participants strongly agreed or agreed that the program offered useful ideas for teaching, helped them to develop skills for teaching and for giving and receiving feedback, and developed collegiality (Table B). The majority also agreed that the program helped develop confidence in teaching and those who did not agree were experienced academics who commented that they were already confident in teaching.

Table B Outcomes

	Strongly Agree	Agree	Neutral or N/A	Disagree	Strongly Disagree
The MMM peer observation program helped me develop my teaching skills	3	7	1	0	1
The MMM peer observation program helped develop a collegial approach to teaching in MMM	5	7	0	0	0
The MMM peer observation program helped me develop a collegial relationship with the other members of the group	7	4	0	0	1
The MMM peer observation program helped me develop my confidence in teaching	3	6	1	2	0
The MMM peer observation program helped me develop my skills in giving feedback	3	8	1*	0	0
The MMM peer observation program helped me develop my skills in receiving feedback	3	8	1*	0	0
I got some useful ideas for teaching	3	8	1	0	0

(*At the time of the questionnaire one participant had not met with the group for feedback).

In interview all participants commented that they had found the program of benefit. Teaching benefits included specific skills such as slowing down, crowd control, time control, lecture theatre acoustics, preparing and structuring lectures, giving feedback on assignments, systematic teaching, helping students concentrate, making information relevant, developing students' concentration and focus, for example:

> Sometimes I find that people [are] very good in handling group discussion … I find that's very useful. Next time I can apply to my own lecture as well (12).

Some participants also commented that the feedback affirmed their general approach, for example:

> From my point of view the feedback that I got was good in that …. I am heading in the right direction with what I'm doing …which is good from my point of view, I don't have to majorly change things to keep going (04).

Two participants from overseas commented on how the program helped in developing their awareness of the differences between teaching in their home country and Australia, one commenting:

> Before I was in China … and also know how to be an effective teacher but this is a different country … you go to class pretty differently … so this is why I'm keen to look at my colleagues. Use different style or performance and can improve, or I will ask my colleague to give comment for my performance (03).

Strengths

In interview, participants were asked about the strengths and weaknesses of the program overall. All participants commented that the program was in various ways useful, effective, valuable to the school

and to their own teaching. All but one participant commented on the development of collegiality and sense of cohesion within the small groups and to some extent across the school. These included the building of relationships, camaraderie, collegiality, and linking staff together, for example:

> I got to know [observation colleague] a lot better and the fact that he was open enough and prepared to let us sit in, and was prepared to discuss it freely … (10).

Two early career academics made a point of mentioning the importance of the positive change in their approach to senior staff, one of them noting:

> I found the other side of [my colleagues] .... so I feel much closer to them and also I have a chance to express my points, which apparently to me they as senior teachers can appreciate, so I feel better and I feel … I can talk. If I have other ideas I can just go directly (09).

A change in perspective occurred for several participants, with one experienced academic saying :

> The thing about this is that it kind of changes your mindset a bit, if you let it. (02).

Some spoke of a different perspective, for example one senior academic found:

> When … you're sitting at the back of the room and you're watching all this happen, you can pick up very quickly on some of these things … that you probably might not appreciate at the time if you're controlling the class (08).

Overall impressions were overwhelmingly positive, for example:

> I think it's something that's got terrific potential. I think there's probably already been some benefits for those who've ... particularly those who've participated in the voluntary part, but, I mean, there was really good attendance at the introductory session, and I'm sure that ... people got something from that; and the discussion part of that was, I think, useful for a lot of people too. I think there was something that came out of that, but ... surprised some people (01).

Terms such as enlightenment, enjoyment, interesting, useful, surprising, practical, gain advice, see how others teach, mix of experience and mindsets were reported.

Weaknesses and improvements

There were few suggestions for improvement. One aspect identified by the Head of School that could be improved in the future was the absence of a method of recording actions and planning follow-up:

> We didn't close the loop very well in terms of I didn't write down clearly what I was going to do as a result of having done this peer observation program (07).

Related to weaknesses was the workload issue. One of the small group convenors commented:

> I never really put much effort into co-ordinating it, for a number of reasons … I think that is reflected in outcomes, really … the fact that [coordinating a small group] was so difficult, I think, is a reflection of resource constraints that we have in this school (11).

Aspects of the program

The preparatory workshop

All respondents agreed or strongly agreed with the propositions that the 2 hour workshop was effective in preparing for the program (Table C).

Table C preparatory workshop

	Strongly Agree	Agree	Neutral or N/A	Disagree	Strongly Disagree
The MMM training workshop was effective in preparing me for the peer observation program	7	5	0	0	0

Participants commented on the value of the workshop in its own right, for example:

> It certainly gave a good insight into the way in which it was going to be done and allowed people to explore the kind of challenges as well as the process and that's what it's all about I think, and hopefully took some of the fears out of it because I think that's one of the major dangers with this is the fear factor, you're going to get exposed (02).

The workshop helped reduce concerns and fears, providing information about process and approach, the Head of School's view was that:

> The workshop … was critical … in getting this on board and giving us a bit of a background … and the manner in which the feedback is given (Cooper).

The workshop included a role-play of a peer observation of the workshop coordinator followed by feedback. This was a useful illustration for some participants, with one commenting:

> The simulation of the lecturing that you gave to us and the way you tried to get feedback on your simulation of the lecture also helps … the practical things, how to listen to you while taking the notes. And I think we found ourselves quite busy observing and trying … like those sections in the pro forma to fill in (09).

A DVD demonstration on giving and receiving feedback (Bell, 2007) also helped participants to understand the importance of mutual respect and collegiality in their discussions.

Observation of experienced teachers

The first stage of the program involved a number of experienced staff giving a lecture or tutorial at which they could be observed. The Head of School considered this an important stepping stone in the program:

> I think part of the issue is trust ... so that's why we had the … introductory observations, to let people get their feet wet. Just be in somebody else's lecture instead of launching into peer observation ... I knew that's what we had to do and I'm absolutely convinced that's the best way to do it … that goes back to building people up to a true peer observation partnership by having a stepping stone which is just observing somebody (Cooper).

Almost all participants found this useful to some extent, because it showed the commitment and support of experienced staff and was an informal, commitment-free opportunity to see what peer observation would be like.

> I guess the purpose of it was an icebreaker, to show that the world wasn't going to end if somebody comes and watches your class. So it certainly was useful there (05).

Two participants reported that for them this was not a necessary step in the program as they did not need further encouragement to take part.

Resources

All participants were provided with a copy of *Peer Observation Partnerships in Higher Education* (Bell, 2005) with the exception of one group who distributed it late in their program. Nevertheless, all participants found it to be a helpful resource (Table D), for example:

> That resource was quite a key resource, even … I only read the bits that I needed to read very soon before each observation or meeting but it was still a key document because everybody was … on the same page (07).

Table D Usefulness of the booklet

	Strongly Agree	Agree	Neutral or N/A	Disagree	Strongly Disagree
The Peer Observation Partnerships booklet was helpful:	5	4	3	0	0

Using an external coordinator

The educational developer presented the preparatory workshop, coordinated the formation of the teams and worked with each group on request. Two groups worked independently, one group invited her to facilitate the preparatory meeting and another group to facilitate the feedback meeting. Most participants responded positively to the question as to the usefulness of an external coordinator, for the whole program and for aspects of the small group activities. In regard to small group activities, the Head of School commented:

> I think without that … our group may have worked differently and not as well … the critical thing about it is that [coordinator] was there just to start the group off and make sure the ground rules were there and … talked through the little bits of the book that we needed to look at and that was really great ... if we had gone in there cold, not knowing what the booklet was about and not having time to read the whole thing, it wouldn't have been used (PC).

A broad perspective on the role of facilitator for the partnership groups was expressed this way:

> Definitely an advantage having someone on the outside coming [who is] experienced and seen all this before, explaining some things and pointing out some of the bits and pieces in the green book which was useful … I personally don't have the time to sit down and read things from front to like back... so I could focus in on certain things ... that would be useful for that situation … And just to explain in general terms what was going to happen and the purposes behind it and I think that helps to set the scene as well. (08).

Members of one group reported not operating as efficiently as they would have liked and mentioned that an external group facilitator could have helped them keep in touch and fulfil their commitments. Other responses to the value of external coordinator included the presence of an external facilitator

who can help suggest ideas, help increase awareness, a knowledgeable person who can provide support for younger early career group members. Absence of bias and help in any possible difficult situations was mentioned by one participant as follows:

> I thought that was actually quite important … because we saw [the coordinator] as somebody who was very knowledgeable about this process … we all know that you've done a lot of work on this … and could provide the support without having any bias ... you haven't got any political baggage associated with teaching in the school, because you're from outside … The other thing is that in terms of forming the groups, I think people were probably much more comfortable about saying, "I'm okay to work with these people; I'm not okay to work with the other ones." I think they're much more comfortable about saying that to an external …because they're neutral ... and then again … maybe the peer observation might have uncovered some really challenging teaching problems ... the fact that you are someone we could go to and say, "Well, look, we found this – it's really difficult; have you got some suggestions or some idea of where we could go to find out something about this?" is also, I think, valuable (01).

Follow-up

Participants were asked what if anything should happen next. All participants requested some kind of follow-up in the next semester or in the following year. Several thought that the program should be broadened across the faculty. Some commented on the difficulties of fitting in new programs while under workload pressures.

> What I felt is, definitely the program is useful, but it requires ... too many observations. It's not that... you go to one class or one lecture and then... you think that you will be able to learn something; but it is a kind-of a continuous process, where you may have to observe and get observed, so many lectures; because lecture to lecture differs, depending upon the topic. So this learning normally, it cannot be just observing one lecture (06).

Conclusions

This study suggests the possibility of peer observation of teaching taking a central role in the professional development of engineering academics. Positive outcomes were reported by all participants in the development of skills and approaches to a range of aspects of teaching as well developing collegiality within the school. The keys to the effectiveness of this case study suggest a framework for effective peer observation of teaching programs within engineering faculties and schools as follows.

- Communicate a clear aim and purpose.
- Focus on the partnership aspect of peer observation of teaching.
- Head of School and Discipline Advisors/Leaders tailor the program with an external facilitator.
- Provide a preparatory workshop and request all full-time teaching staff of the school to attend.
- Experienced staff model the act of being observed by offering initial observation sessions.
- Form partnership groups of 3-4 in a way that allows participants to choose partners confidentially.
- Support partnership groups in their planning and feedback meetings with a resource (eg, Bell, 2005).
- Consider external facilitation at least to get the groups started.
- Evaluate the program both quantitatively and qualitatively.
- Share and celebrate the program and outcomes with the rest of the Faculty.

Counter-productive efforts are most likely to arise in peer observation through (Blackwell & McLean, 1996). In the case outlined here, potential problems were overcome by careful preparation and attention to process and the authors recommend the use of peer observation partnerships following this model to engineering schools in other universities.

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