Tutor Training Program: A Pilot in Electronic Engineering

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***Abstract**: The authors conducted a program to develop a tutorial model that can be broadly applied across engineering based courses that is effective for student learning but also low maintenance for lecturers. An initial half-day workshop was run by the authors for a pool of tutors within the School of Electrical & Electronic Engineering before the start of a semester. The workshop aimed to provide support for the basic tutorial model as well as improve teaching quality among the participants. A series of follow up interviews were conducted at the conclusion of the semester. The impact of the program was found to be variable among the tutor cohort.*

Introduction

While lectures provide a solid theoretical framework, tutorials are an opportunity for students to try out their new skills, to apply and to rethink initial ideas from lectures. In engineering courses, particularly in the early years, the traditional approach to the tutorial is often applied: the lecturer sets a number of problems and one or more tutors are then responsible for assisting the students to develop solutions to these. In this model, the tutor plays a central role in delivering the tutorial. Over time, students may develop a degree of dependency on competent tutors for their learning, which is detrimental to their long-term learning autonomy. On the other hand, students could become disenchanted and lose engagement with his/her own learning if taught by incompetent tutors. Balancing the quality of tutorials as important learning events and instilling an appropriate pedagogy among tutors are therefore crucial to the overall learning and teaching success of a University course.

Frequently, tutors are postgraduate students who have only recently taken the course themselves (Friedberg 2005). As an undergraduate, the tutor would likely have a mixed (positive and negative) learning experience, which shaped the ways in which he/she would deliver information to and interact with students. The new tutor is faced with many new responsibilities and challenges: their knowledge and expertise of the field will be tested, as will their ability to manage time, engage the class and earn respect. The ways in which tutors prepare before their classes is as important as what they actually do in the classroom. Early experiences of teaching are likely to modify the ways in which they prepare and also manage the class; bad experiences may encourage the tutor to engage less with the class and to control the progression of material more. The beginning tutor cannot be expected to instinctively know how to teach well and so tutor training is vital to their success. Further complicating the process is the often culturally diverse post-graduate population who undertake tutoring in a research-intensive university. Many international post graduates have some prior teaching experience, but typically in a totally different learning and teaching environment common to the English-speaking world. These differences deeply affect the style of teaching employed by these tutors, as well as their engagement with students and management of tutorial sessions. Some degree of (re-)training of these tutors is also needed to ease their adaptation to teaching at a Western style University.

Another dimension to post graduate tutors is the possibility of teaching as a career. While this is perhaps not as common in engineering as in some fundamental fields of study, there is still a significant population of tutors who are attracted to academia as a career. In these cases, tutoring takes

on an extra level of meaning and importance over the casual post graduate teacher. Naturally, these tutors are much more interested in developing their teaching skills and pedagogy, and the tutor training program can assist them in this endeavour.

Despite the many desirable outcomes from tutor training programs, they are, a little surprisingly, not commonly reported in the literature. The primary aim of the tutor training program is to improve tutor quality within the traditional tutorial framework. On occasions, it may be more useful to re-examine the tutorial model, as investigated by Rowe and Harper (2000), but very often this is not an option available to tutors. Instead, the philosophy of the authors' approach is more closely aligned with that of the RED (Recognition, Enhancement, Development) sessional teaching project (2007). In their report, five domains for quality enhancement have been identified, of which two are partially addressed by the tutor workshop: "Induction and Academic Management" and "Professional and Career Development". Furthermore, one of the cited good practice examples from the RED report is the provision of tutor training in . The literature contains a significant body of work on peer tutoring (Saunders 1992, Topping 1996), and although peer tutoring is not the subject of this tutor training program, many issues discussed in these works are relevant to the development of the program. In particular, the role of tutorials in the mutual development of tutee (as learner) and tutor (as teacher) as described in the literature has influenced our approach to tutor training.

This paper describes a tutor training program trialled in the School of Electrical and Electronic Engineering by the authors. Following an initial workshop in which all tutors receive basic training, tutors were interviewed to gain an understanding of how the training has changed the ways in which they teach and feel about teaching. This paper also reports on the effects on the tutors' plans for future teaching assignments and possible future directions for the tutor training program.

Tutorial Model

Pedagogical approaches to tutorials range from the tutor simply presenting information, a 100% tutor driven learning process, to Problem Based Learning, a style in which tutors play a guiding, ideally invisible role in student learning. Both authors apply tutorial models that fall somewhere between these extremes. The models used have emerged from the resource limitations faced: class sizes are large with between 20 and 25 students to a tutorial group, timetabling is such that classes are run concurrently and the pool of available tutors is small and their knowledge and expertise variable.

Tutorials are held regularly either weekly or fortnightly. As it is neither possible nor desirable for the lecturer to take all classes, the tutorial papers are designed to be valuable for self-study by students and independent of teaching personnel. Tutorial papers are available in advance and fully worked solutions are provided online after the tutorial class. Papers typically contain more problems than can be covered in a single tutorial class. Students are advised of particular problems to concentrate on and are encouraged to attempt the other problems after the tutorial. The questions range from relatively simple questions intended to make the students apply the lecture materials in a direct manner to more complicated problems that aid in developing a deeper understanding of the material. Usually more than one of each kind of problem is provided as this allows comparisons to be made that may lead to better understandings of the details. Both authors hold tutor meetings before each tutorial class to brief the tutors on the nature of the various problems, and suggest priorities for coverage in class. Worked solutions are provided to tutors in advance of such meetings, and any technical queries are discussed during meetings.

In terms of teaching style, tutors are *strongly discouraged* from merely presenting material and are encouraged to be more creative in how they present information and develop solutions to problems, with the aim of engaging the class whenever possible. Two methods that help prevent the tutorial from becoming a mini-lecture which are within the capabilities of most tutors are:

1. The tutor goes through the problem on the board but refrains from copying verbatim the solution from the solution sheet. He or she steps through the problem in detail, slowly, at each step seeking approval from the students before continuing on. He or she needs to show explicitly where ideas and equations come from by referring to the lecture material, elaborating on alternative ways for solving the problem, highlighting places where one could go wrong and what an examiner would look for when marking a similar problem. Tutors may explore the question further than originally

envisaged by making slight changes to the original problem and discussing the ramifications for the solution; this allows for a much deeper understanding of the problem. This usually requires the lecturer to prepare the tutors to some degree in the tutors meeting before the class.

2. The class is divided up into smaller groups of four to five and each group is given a different problem to work on as a team. The tutor moves between the groups, motivating each team and facilitating the discussions. He or she only takes a more active role when the students get their answers up on the board, encourages them to consider extensions of the problem and to think about how things might change if the problem were a little different. Tutors are sometimes apt to do this for fear of loosing control of the class or not being able to manage time. However, once it is pointed out this approach involves them doing less work they are usually more interested in giving it a go. The effectiveness of this approach may be constrained by practical factors beyond our control, such as room configurations.

Both authors deal with the quandary of tutor variability by assigning tutors randomly to the classes each week. In this way, every student is exposed to a variety of teaching styles and problem solving strategies. By having access to more than one tutor, students with difficulties are also more likely to find someone they feel comfortable with, e.g. someone of a particular gender and/or ethnic background, which is especially important in engineering courses where there are very few females and a high number of overseas students. The first author also employs a simple assessment scheme that rewards students for active participation to increase in class motivation: marks are awarded for preparation on a 0-3 scale and are based on evidence of preparatory effort rather than correctness (0 for no show, 1 for attendance, 2 for attempting half and 3 for attempting a majority of the problems). Students can also redeem points through participation in class. The tutors are assigned the task of administering this assessment.

Student Feedback of Tutorials and Tutoring

The first author had the opportunity to be involved in interpreting a survey conducted on final year students about their experiences of learning and teaching in the school. Two key issues emerged: (1) Regular, smaller formative exercises provide students with a much better understanding of the material than larger exercises alone; (2) Students expect lecturers to be actively involved in setting formative exercises that are relevant to the course, in ensuring that tutors are well prepared, and in taking action when problems emerge. This prompted the first author to take a closer look at her own tutorial model and tutors. In order to gain a more detailed understanding of students concerns about tutorials and tutors, another survey was conducted. This survey revealed that students were satisfied with the tutorial model used but had concerns with the tutor quality. Students felt that tutors were not well-prepared and lacked knowledge and expertise. In response, the author conducted a pilot tutor training session. The session quickly revealed that the tutors had very little idea of what was expected from them or of the various teaching methodologies they could employ and they requested further training. The principal activity of the session was to understand, as a group, the student survey responses. The comments written by the students were confronting but lead to useful discussion. The tutors agreed that:

- Their preparation before tutorials tended to slip throughout the semester and that the survey was a wakeup call.
- They often realized once in the class that they were not as well-prepared or organized as they had initially thought.
- They often felt a lack of confidence and a need to control the situation, which resulted in resorting to copying information onto the board and moving quickly through material.
- They did have the necessary expertise and knowledge. The author agreed with this.

A likely explanation of the student responses in the survey is that they are interpreting the tutors lack of confidence and also lack of good preparation (which further leads to a lack of confidence) as a lack of knowledge and expertise. The surveys also revealed a lack of respect for the tutors both personally and on their authority on the subject, and a preference for the lecturer as the tutor.

The Tutor Training Workshop

Both authors designed and ran the school's first tutor training workshop with ten tutors. Nine of these had tutored before for one or both of the authors and one had never before tutored. The workshop was three hours in duration. The program for the tutor training workshop consisted of a number of activities and discussions:

- Preparatory reading and activities using selection of materials from the University of Adelaide's Centre for Learning and Professional Development (CLPD) Sessional Teaching Program Modules. They were also asked to prepare a problem of their own choosing for a pretend tutorial.
- Group discussion (based on CLDP's Sessional Teaching Program Module 7, Exercises), which included topics such as: "What was it like to be a student?", "Student and staff expectations", "Level of understanding of material that is required to teach", "Amount of preparation/planning that is required", "Making mistakes, being honest and earning respect", "Group dynamics", "Presentation of material (skills and techniques)", "Facilitation versus teaching", and "Cultural diversity, minority groups and students with disabilities".
- Mock Tutorial Activity: Each member of the group to give a pretend tutorial on his/her prepared question chosen from an existing tutorial paper. The rest of the group provided feedback.
- Group Discussion: Meeting Student Expectations. Discussion of student survey results from previous semester: What can we do to meet these expectations? Possible Solutions considered were: Better preparation and planning; Tutors meetings that focus more on planning; Continuous training of tutors; Greater involvement of tutors in the course (e.g. contributions to online discussion board); and, Activities for tutorials.
- Assessment. Marking issues were briefly highlighted by the second author and included: consistency, rewarding versus punishing, marking for understanding, aligning marking with course objectives, dealing with plagiarism, and giving feedback to the lecturer and students.
- The road ahead. Key messages we wanted to convey to the tutors were: (i) Be more involved – use your instructor privileges on the Web to actively participate on the discussion boards, sharing tips and tricks, provide alternative solutions, and value adding in general. (ii) Let the course lecturer know what your expectations are. (iii) Take pride in your teaching, seek feedback via SELTs and Peer Evaluations, and to construct a teaching portfolio.

Tutors reflections on the workshop

To gain a better understanding of the tutors experiences since the tutor training workshop we used phenomenographic interviewing. Phenomenograpghy (Ashworth and Lucas, 2000, Bowden and Green, 2005, Bowden and Walsh, 2000) is the empirical study of the qualitatively different ways in which aspects of the world are experienced. One of its strengths, as described by Trigwell (1996) is that it "provides a way of looking at a collective human experience of phenomena holistically despite the fact that such phenomena may be perceived differently by different people and under different circumstances". Interviewees reflect on and reveal their way of experiencing the aspect of the world in context. By using this approach we hoped to learn things that we would otherwise not have from standard surveying.

Six of the ten tutors who attended the tutor workshop granted the authors fifteen minute interviews to discuss their teaching from the past semester as well as their reflections on the workshop. From the collected responses, we found several trends:

- Every tutor found confidence to be paramount to their perceived success of a tutorial session, and adequate preparation underpins much of that confidence. The level and style of preparation vary greatly among individuals. Some tutors aligned themselves to the lecturer's solutions or approaches, while others consulted textbooks and cross verified the provided solutions, often instilling their own personal changes in their presentations to students.
- A majority of the tutors were motivated to "make a difference" to the learning and teaching outcomes of the students. These tutors also seeked ways to contribute more to the *teaching team*, to work closer with the lecturers and have greater ownership in the teaching of the courses. Some have uttered dismay at a perceived lack of avenues to achieve this.

- A major proportion of the tutors are from international backgrounds with great cultural differences to English-speaking countries. They unanimously spoke of the high respect they have for teachers and teaching as a profession. Unsurprisingly, these tutors are often dedicated teachers themselves and tend to prepare well for tutorials. However, the class engagement aspect is often missing from their previous educational experiences and the necessary cultural adaptations have made tutoring a challenging proposition, at least initially.
- The tutor training workshop provided mixed results with the participants. Some have explicitly praised its usefulness in preparing them for the semester which unfolded, as well as providing "food for thought" in their pursuit of teaching as a possible career. However, several respondents did not mention about reflecting on the value of the workshop to their teaching.

From the trends identified, there are several paths to take in the development of the tutor training program. The importance of fostering a close-knit teaching community within a School needs to be elaborated and perhaps even explicitly addressed. The community may manifest itself in several forms, from tight teaching teams for a single course, to a collection of such teams across a year level, or maybe even across an entire program. The cultural differences between local and international students and tutors need to be harnessed to achieve learning and teaching goals of a given course or program. A large international student population, at under and post graduate levels, is a reality for Universities in English-speaking countries, and all sets of cultural values and approaches towards learning and teaching need to be assimilated to maximise the benefits to the students as well as the tutors. For example, the strong premium placed on student engagement in Western style education systems can complement a greater promotion of respect for teaching staff at all levels, which is a typical trait of eastern cultures.

Conclusions

Having followed a number of the tutors through from the initial pilot study it has become obvious that for a tutor training program to work well it needs be continuous. Tutors need the opportunity to try things out and then reflect before modifying what they are doing. Potential strategies for encouraging this include conducting focus sessions regularly during the semester and using tutors for a range of different courses or carrying out different assessment tasks.

The phenomenographic interviewing revealed that the technical content of the tutor training program was secondary in importance to the contact and repertoire between tutors and the lecturers. Tutor training should not be course specific, but instead focus on fostering a teaching team environment. Tutors also revealed a strong preference for having ownership of teaching, with ability to provide feedback to the lecturers, and to offer their own expert opinion on the course materials, such as alternative solutions to problems. A practical mechanism for creating a stronger teaching team can be marking group meetings, a forum where lecturer and tutors determine marking scheme for assignments together.

Tutors need to be encouraged to actively earn the respect of students. A useful means to achieve this is through participation in online discussion boards, offering extra insight or posting alternative solutions to tutorial problems. Lecturers can promote their tutors by incorporating discussion on the work of particular tutors during lectures, and sharing their achievements with the entire class. Students in return can appreciate the real value added by the tutors when they share tips, tricks, pitfalls and general experiences.

We have also observed that while you can explain ideas to tutors that they can use in their teaching or give them feedback it is not always easy for them to implement these ideas. To understand this better we plan to undertake further studies using ethnographic observation (Atkin and Hammersley 2007), which is a scientific approach to gathering data as opposed to a peer evaluation in which bias, assumption and habituation can come into play. We believe that it is important to establish trust with our tutors before contemplating such studies.

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