A Tutoring Quality Program for a Department of Computer Science

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Abstract

Tutoring (small group teaching) is an important part of computing education at many universities. The quality of the tutoring experience may have a significant impact on the future of both students and tutors.

This paper describes a Tutoring Quality Program that aims to ensure high-quality tutoring in a Department of Computer Science. An unusual aspect of this program is that it is designed to create a community of practice amongst all tutors for all courses in the department, rather than being a training program for novice tutors, or a training program for casual tutors, or a training program for tutors in programming courses.

Keywords: community of practice, computing education, professional development for academics, quality, tutor training.

1 Introduction

High-quality computing education is an important part of preparing for the future as information technology becomes increasingly integrated into daily life. Computing educators need to provide learning and teaching environments that are suitable for students and tutors[1] from all backgrounds.

This paper describes the Tutoring[2] Quality Program (TQP) that aims to ensure high-quality tutoring in the Department[3] of Computer Science (DCS) at the Australian National University (ANU).

Although the Appendix to this paper contains two questionnaires, this is a discussion paper, not a research paper. Section 2 briefly explains the importance of the tutoring experience for both students and tutors. Section 3 gives a brief history of TQP. In Section 4, TQP is compared to, and contrasted with, other programs for tutors of computing. Sections 5 to 8 describe, and reflect upon, TQP. Section 9 concludes the paper with the hope that some readers may be interested in developing their own TQP.

2 The Importance of the Tutoring Experience

> *Small group tutorials and laboratory classes are a vital component of the undergraduate computer science curriculum.* (Stern 1998)

The quality of the tutoring experience may have a significant impact on the future of both students and tutors.

2.1 Student Perspective

For many students, especially first year students, the member of academic staff with whom they will have most contact is their tutor.

> *In large undergraduate classes, there is often reduced scope for direct interaction between students and the lecturer. Consequently, tutors and demonstrators are often the "first port of call" for students seeking assistance. Maintaining the quality of teaching is a significant undertaking.* (Kirley 2006)

Even in computing subjects, the quality of learning that takes place depends on personal interactions, not just on the excellence of the technical environment.

> *We know from the literature that a student's overall course experience is affected by that student's interactions with peers and staff; and that a student's intellectual development is also affected by inter-personal factors.* (Asmar 2000)

Students whose previous educational experiences differ from those of their tutors may find attendance at tutorials an alienating experience. For example,

> *Asian students are usually result oriented and learn by listening and reflection. On the other hand western teachers expect students to develop independence, engage in dialogue and develop*

[1] In this paper, the term "tutor" is used for all staff undertaking small group teaching.

[2] In this paper, the term "tutoring" covers all small group teaching, including "demonstrating" at laboratory sessions.

[3] The organisational unit that ANU calls a "Department" may be called a "School" at other universities.

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> *critical thinking. These differences can result in dissatisfying and unproductive classroom encounters.* (Shukla & Sathu 2005)

Similarly, students accustomed to the western teaching tradition may be dismayed to discover that their tutor is an international student whose approach to small group teaching is to stand at the front of the room, with his back to the class, and write The Answers on the whiteboard.[4]

An unfortunate experience with small group teaching may cause students to change their course, their degree program[5], their university, or even their country of study. It is difficult to capitalise on investments made in curriculum development and course design if students abandon computing courses due to unsatisfactory tutoring experiences.

2.2 Tutor Perspective

An unfortunate experience with small group teaching may cause a tutor to decide against a career in academia.

Many future academics have their first teaching experience as casual student tutors for courses being run by the university at which they are studying.

> *Since many permanent academic staff have their first taste of teaching as a GTA[6], catching academics at the start of their career when they may be enthusiastic and willing to embrace issues of pedagody [sic], is a good investment for them, the university and the students they teach.* (Barrington 1999)

Newly appointed members of fulltime academic staff may have no experience in, and no training for, the tutoring role.

> *While most staff appointed to academic positions have already completed a research degree, and thus have already received training and experience in the methodology of their research, there is no parallel provision for preparation for their teaching role. This is especially ironic when teaching occupies such a large part of a new academic's time and energy.*
>
> *Studies in the 80s and 90s in the USA, UK and Australia have indicated that most new academics feel isolated with little support from their colleagues. It is little wonder then than many new academic staff find their first years stressful and the experience of teaching difficult.* (Adams & Rytmeister 2000)

Tutoring may be an important source of income for some casual tutors, especially postgraduate students. An unfortunate experience with small group teaching may cause student tutors to abandon their course of study as well as their tutoring role.

A postgraduate student who is tutoring in his/her supervisor's course may be reluctant to raise issues related to his/her tutoring experience with his/her supervisor, especially if s/he fears that the queries may be regarded as unacceptable ignorance.

Tutors may find it difficult to discover the cultural norms that are assumed to apply in tutorials and laboratory sessions. This problem is particularly relevant to tutors who are teaching at a different university from the one at which they were undergraduates. These tutors may not even be aware that "the way we do things round here" is not the same as the way things were done at the university where they were undergraduates.

Mature age tutors, especially those employed in industry, may not realise the many ways in which the current undergraduate student body, especially in computer science, differs from the undergraduate student body of which they were a part. For example, young students are already familiar with a range of information technologies.

> *Born between roughly 1980 and 1994, the Millennials have already been pegged and defined by academics, trend spotters, and futurists: They are smart but impatient. They expect results immediately. They carry an arsenal of electronic devices -- the more portable the better.* (Carlson 2005)

Nowadays, many undergraduate students are in paid employment while they are studying; and the current student body contains a significant number of fee-paying international students.

> *The composition of the student body seems to be evolving into a shifting multicoloured kaleidoscope far removed from what many fondly (if perhaps inaccurately) recall as the homogeneous monoculturalism of campuses in the past.* (Asmar 2000)

3 Brief History of TQP

TQP was first established in DCS at ANU in 1997. From 1997 to 2000, TQP was convened by Faculty Education Officers. Fourteen seminars were run in 1997-2000. The program lapsed when the Faculty ceased to employ a Faculty Education Officer.

After becoming aware of anecdotal evidence that not all was well in DCS tutorials, an academic in DCS re-established TQP in 2001 and acted as its convener until the end of 2005. Twenty-three seminars were run in 2001-5. In 2006, the program is being convened by another DCS academic (with support from the retiring convener).

TQP material produced by the Faculty Education Officers in 1997-2000 was not made available to the author. Therefore, this paper concentrates on the period 2001-5, particularly 2004-5.

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[4] A Chinese postgraduate student, employed as a casual tutor for a course being run by the author in 2002, behaved in this way.

[5] Other universities may use the term "course" where ANU uses the term "degree program".

[6] Graduate Teaching Assistant. Barrington assumes that the terms "GTA" and "tutor" are synonymous.

4 TQP Compared to, and Contrasted with, Other Programs for Tutors of Computing

TQP is similar to other programs for tutors of computing in that it provides support and training for tutors.

TQP differs from other programs for tutors in that it is designed to involve all those who teach in DCS, not just novice tutors (cf. Kay 1995; Pavelich & Streveler 2004), not just casual tutors (cf. Stern 1998; Kirley 2006), and not just tutors in programming courses (cf. Carbone, Hagan & Sheard 1998; Sheard & Hagan 1999).

Kay (1995) describes

> *a one-quater seminar required of first-time teaching assistants in computer science. The seminar acclimatises TAs to teaching undergraduates in the university, to departmental policies and to special problems and issues in computer science. In addition to coverage of general issues surrounding teaching, the seminar includes many participatory exercises that relate specifically to the teaching of computer science.*

TQP covers many of the same topics and activities as this seminar for new TAs.

> *We discuss good and bad qualities of teachers, based on the participants' own experiences. We also cover general guidelines and philosophies of exams and grading. We conclude with a session on different learning styles (auditory, visual, and kinesthetic) and a session designed to sensitize new TAs to teaching a culturally diverse student body* (Kay 1995)

Pavelich & Streveler (2004) also describe a training program for new graduate TAs.

> *For over a decade, new graduate Teaching Assistants (TAs) from four departments at the Colorado School of Mines have been part of a three-day training program prior to the start of the fall semester.*

TQP differs from both these seminars for new TAs in that TQP seminars are run throughout the academic year, and, most importantly, in that all tutors in DCS are involved in TQP, not just new graduate students.

Stern (2004) describes a "training and support program for casual staff involved in undergraduate teaching in the Department of Computer Science at The University of Melbourne".

TQP contains some of the same elements as this training and support program, such as the provision of printed material, and

> *Small group discussions, designed to encourage staff to talk about their experiences and problems ... Participants spanned a range of experience, and those who had been with the department before were encouraged to share their experience with the less experienced.* (Stern 2004)

Kirley (2006) describes

> *the implementation and evaluation of a comprehensive Department-based training and support program for casual tutors and laboratory demonstrators at the University of Melbourne. The program provides a structured approach to help casual staff develop an understanding of what is involved in high quality teaching and student learning, which can be applied in a computer science and software engineering context.*

TQP is similar to both these training and support programs at the University of Melbourne in that it is department-based. TQP at ANU differs from both these programs in that it trains and supports all tutors in DCS, not just casual tutors.

Sheard & Hagan (1999) describe "a teaching community approach to the introductory programming subjects" and note that

> *The reality of teaching, with the unexpected situations that arise, is often quite different from what tutors anticipated. In order to effect real change in behaviour, it is essential to provide ongoing support for new tutors during the semester.*

TQP is similar to this program in that it takes a teaching community approach to tutoring in DCS courses, including first year programming courses. TQP differs from this program in that TQP is designed to provide ongoing support for all tutors in DCS, not just new tutors, and not just tutors in programming subjects.

5 Description of TQP

TQP is designed to create a community of practice (CoP) amongst all tutors for all courses[7] in DCS.

Tutors are brought together at a series of seminars throughout the academic year to discuss topics directly relevant to small group teaching in the department. The seminars are organised and funded by DCS. While ANU has published a *Manual on Tutoring & Demonstrating* (CEDAM 2003) and has established several groups that supply support for tutors (Academic Skills and Learning Centre, Centre for Educational Development and Academic Methods, Information Literacy Program), advisers from these groups are usually inexperienced in computer science education. Tutors in DCS, especially tutors who have not previously tutored in DCS, appreciate a program which is run locally and which is tailored towards their more immediate needs.

> *The provision of appropriate training for tutors imposes certain logistic difficulties. First, the training may be specific to a particular discipline or to a set of related disciplines. Second, the turnover of tutorial staff is large ... Third, many tutors are not appointed until the teaching semester is almost under way. These difficulties*

[7] Other universities may use the term "unit" where ANU uses the term "course".

suggest that tutor training is best managed on a School basis. (TEDI 2005)

At TQP seminars, every person who tutors in DCS, from the Head of Department to a casual student tutor, is invited to reflect upon best practice for small group teaching in DCS. Permanent members of academic staff are encouraged to see casual tutors as colleagues in the tutoring role. Casual tutors are encouraged to see themselves as part of an academic community committed to excellence in teaching.

5.1 Approach Taken by the 2001-5 Convener

The 2001-5 convener recalls attending a TQP seminar in 1997 where a guest presenter[8] stood at the front of the room and lectured for one hour and forty minutes on why tutors should not stand at the front of the room and lecture. In contract to this lecturing approach, the 2001-5 convener designed seminars to create a "collegial atmosphere that would support discussion of teaching issues." (Adams & Rytmeister 2000)

> *The aim is not to instruct the academics in any "right way" to teach. Instead, the aim is to facilitate debate, where the teachers identify the problems, and in finding the solutions they construct their own "pedagogic reality".* (Kutay & Lister 2006)

The 2001-5 TQP convener wished to create a CoP for tutoring in DCS rather than to instruct tutors. Wegner (n.d.), on his CoP web page, gives the following definition:

> *Communities of practice are groups of people who share a concern or a passion for something they do and learn how to do it better as they interact regularly.*

The regular interaction was achieved by having as many DCS tutors as possible physically present at each TQP seminar. Although a TQP website (Edmondson 2006) was available in 2001-5, the retiring convener believes that there is nothing like "being there" for effectively pursuing CoP activities such as: problem solving; requests for information; discussing developments; mapping knowledge and identifying gaps. (Wegner n.d.)

The approach taken by the retiring convener is epitomised by these extracts from her TQP home page (Edmondson 2006):

> ***TQP Objective***
>
> To provide a supportive environment for tutors in which they can exchange knowledge and wisdom, thus ensuring top quality tutoring in DCS
>
> ***Learning Outcomes***
>
> After a successful TQP seminar:
>
> - Tutors will have learnt more about best practice in small group teaching in DCS
> - Course coordinators will have learnt more about the problems faced by tutors in DCS
>
> ***Definition of a Tutor***
>
> **tutor** *n.* a person who undertakes small group teaching

5.2 Perennial Problems

Despite the best efforts of the 2001-5 convener, some presenters, especially guest presenters, failed to understand that the aim of TQP is to involve the tutors present at a seminar, not to lecture at them. Also, some guest presenters ran well over their allocated session time, even though time allocation was discussed with them and agreed in advance. Presenters who performed poorly were not asked to present again.

Some fulltime members of academic staff refuse to see themselves as "tutors". These academics fail to understand that a person who undertakes small group teaching is a tutor, even if s/he is also an Academic A or a Senior Lecturer. Fortunately, DCS Heads of Department do not suffer from this lack of vision.

It is difficult (but not impossible) to strike a balance between the needs of experienced tutors and the needs of new tutors, especially new casual tutors who were not undergraduate students in DCS. Also, some tutors wish to see the same topics year after year, even seminar after seminar, while other tutors crave constant novelty.

6 Program Organisation

The keynote for organising TQP is flexibility.

Each year, a number of TQP seminars are held. The number of seminars in a year has varied from one to six.

Each seminar contains one or more sessions. Each session addresses one or more topics. Sometimes, all the topics in a seminar relate to a particular theme. Sometimes, the sessions in a seminar are independent of each other. Each session has a presenter. Where appropriate, these presenters are drawn from outside DCS, especially from the ANU groups that provide support for teaching. This peripheral participation in the TQP CoP is a gentle way of educating these outside groups about computer science education.

Seminar length varies. The retiring convener found that the most successful format was to allocate two hours to a seminar and to schedule sessions in only the first one and a half hours. The last half-hour was formally allocated to refreshments but was time that could be used to cope with session over-runs.

Substantial refreshments are served after each TQP seminar. Usually, tutors remain chatting at the refreshments venue for at least an hour after the end of the seminar.

[8] A presenter from outside DCS.

Example of a Timetable for a TQP Seminar:

2005 TQP1 Seminar

What's It All About?

Seminar Room

4.00pm Arrival
1. sign in
2. make name tag
3. collect handouts

4.10pm Welcome

4.15pm What DCS Expects from Tutors

4.40pm Tips for Tutors

5.00pm Learning Styles

Staff Common Room

5.30pm Refreshments

6.1 Session Topics

There is no formal process for deciding which topics will be covered in a TQP seminar. Wherever possible, the retiring convener included topics suggested by tutors. Questionnaires completed at the end of TQP seminars (see Appendix) asked for suggestions for topics to be covered at future seminars. Other topics were suggested by academics in the department, or by session presenters, or by discussion at TQP seminars.

Issues about the mechanics of being a tutor (the payment system; how to get whiteboard markers; where the paper for the printers is stored; who is allowed to give extensions for assignments?) were addressed as well as pedagogical issues. When pedagogical approaches were discussed, practical suggestions that related directly to how things are done in DCS were included in the presentation.

The session topics in 2005 were: What DCS Expects from Tutors; Tips for Tutors; Learning Styles; Helping Students Learn How to Learn; Quality in Teaching; Making the Grade; Cross-Cultural Communication.

The session topics in 2004 were: What DCS Expects from Tutors; Tips for Tutors; What You Always Wanted to Know About Students But Were Afraid to Ask; streams [Student Registration and Marks System]; Tutors Accounts; Why We Run Lab Sessions; How to Run a Perfect Lab Session (and Teach Ravens to Fly Underwater); First Year Lab Sessions; Student Attitudes to Collaboration, Plagiarism, and Cheating; Collaboration, Plagiarism, and Cheating in DCS; Group Work; Information Literacy and Tutoring Styles; Assessment; Assignment Marking.

6.2 Seminar Scheduling

In 1997-2000, various time slots were used for TQP. Lunchtimes (with lunch provided) were popular with student tutors. Friday afternoons (with drinks and nibbles to follow) were preferred by senior academics but disliked by casual tutors. In 2004-5, the seminars were held in the timeslot set aside for Departmental Seminars (Wednesday starting at 4pm). The retiring convener considers that the use of the Departmental Seminars timeslot (with drinks and nibbles to follow) was the most successful scheduling for TQP, even though some tutors could not attend because they were teaching at the time. The use of the Departmental Seminars timeslot helped to legitimise the program and to increase the level of attendance by fulltime academics.

Tutors, and other academics, regularly suggest that the first TQP seminar for the year (TQP1) should be held during Orientation Week (O Week). The difficulty with implementing this suggestion is that the TQP convenor does not know, in O Week, who the DCS tutors will be. The number of tutors that DCS employs depends upon the number of students in DCS courses. Given that students at ANU may alter their course enrolments without penalty during the first two weeks of semester, Teaching Week 2 was judged to be the earliest sensible time to schedule TQP1. In 2004-5, TQP1 was run in Week 2. Unfortunately, some new tutors missed out because they were employed after TQP1 had been run for that year. In 2006, TQP1 was run in Week 3.

6.3 Seminar Notification

Various approaches have been used for notifying tutors of TQP seminars. Originally, the Departmental Administrator sent notifications by email. Later, course coordinators were asked to notify their tutors. In 2001-5, the TQP seminar schedule was available on the TQP website and hardcopies of the TQP schedule were available at TQP seminars. The retiring convener considers that having course coordinators notify their tutors was the most successful approach, even though some permanent academics refused to do so or sent notifications only shortly before a TQP seminar was due to start. (The use of the Departmental Seminars timeslot helped to circumvent these problems.)

6.4 Payment for Casual Sessional Tutors

Casual sessional tutors who attend TQP seminars are paid at the Other Required Academic Activity rate for the time formally allocated to the seminar (usually two hours). Tutors claim for TQP on the "Gold Forms"[9] used for claiming other part-time teaching payments.

7 Feedback from Tutors

The retiring convener found that much valuable feedback was available around the refreshments table at the end of TQP seminars. At other times, tutors offered feedback in corridors, in the staff common room, in the convener's office, and via email.

[9] The DCS claim form for Part-Time Teaching Contract Hours is photocopied on to gold paper.

More formal feedback was available from the TQP Questionnaires (sometimes called TQP Surveys). In 2004-5, the questionnaires were handed out at the last TQP seminar for the year (TQP4). In 2004, sixteen tutors (other than the TQP convenor) attended TQP4 and eleven questionnaires were completed (a response rate of 69%). In 2005, seventeen tutors (other than the TQP convenor) attended TQP4 and sixteen questionnaires were completed (a response rate of 94%).

7.1 What Tutors Like *Most* about TQP

Responses from the 2004 Questionnaire

Four (36%) of the eleven respondents nominated discussion amongst tutors as the most-liked aspect of TQP. For example:

> *Interactive discussion on topics*

Other responses included:

> *anecdotes are always good*
>
> *Peter's war stories from 1100.*
>
> *convivality* [sic] *(if I spell it right)*

Responses from the 2005 Questionnaire

Five (31%) of the sixteen respondents nominated discussion amongst tutors as the most-liked aspect of TQP. For example:

> *Discussion about experiences of other tutors with regard to the topics*

Other responses included:

> *Time to stop and consider tutoring/teaching methodology etc.*
>
> *The opportunity to reflect on my performance as a tutor.*
>
> *Refreshment (as usual)*
>
> *the nibbles afterwards*

7.2 What Tutors Like *Least* about TQP

Responses from the 2004 Questionnaire

Five (45%) of the eleven respondents left this section blank or nominated "nothing" as the least-liked aspect of TQP.

Other responses included:

> *Long lectures on topics such as plagiarism*
>
> *The seminars where we were lectured to*
>
> *That I missed half of each due to taking a tutorial!*

Responses from the 2005 Questionnaire

Seven (44%) of the sixteen respondents left this section blank or nominated "nothing" as the least-liked aspect of TQP.

Other responses included:

> *The talks are often drawn out more than they have to be*
>
> *The Equity & Diversity talk was OK but I think we needed more specific advice on ways not to offend.*
>
> *Why don't we ever discuss curriculum issues?*

8 Reflections on TQP

One reason that the current TQP format is viable in DCS at ANU is that DCS is not a large organisation. DCS has some twenty members of academic staff and a similar number of casual tutors[10]. (In the recent past, DCS had more casual tutors. A decline in student numbers, an ANU decision to discourage DCS from employing undergraduate students as tutors, and a DCS budget initiative to have each tutor take several small groups have all led to a reduction in the number of casual tutors employed.)

One reason that the current TQP format is valuable in DCS at ANU is that DCS is not a small organisation. In times gone by, a CoP for tutoring could function effectively through informal, unscheduled gatherings in the tea room. Nowadays, scheduled seminars are an appropriate way to structure the interactions in the expanded community.

It may be appropriate for a large department developing its own version of TQP to run several series of seminars, one series for each tutoring community of an appropriate size.

In the retiring convener's experience, the best number of attendees for a seminar was between twenty and forty. With fewer than twenty people in the seminar room, it was difficult to sustain interactive discussion. With more than forty people in the seminar room, discussion sometimes developed into exchanges on subjects not necessarily related to session topics.

The refreshments at the "end" of each TQP seminar are an important part of building the CoP. The informal, unstructured interactions that take place around the refreshments table assist tutors to "build relationships that enable them to learn from each other" (Wegner n.d.).

To run a successful TQP requires continual effort and much tact. The effort required of the TQP convener should be recognised in workload calculations.

9 Conclusion

The quality of the tutoring experience is important for all concerned: the students, the tutors, and the department organising the tutoring.

Despite the perennial problems, TQP has successfully created a tutoring CoP in DCS at ANU that has helped to develop and maintain high quality tutoring.

The author hopes that some readers of this paper may be interested in creating their own TQP. Such readers are

[10] 25 in Semester One 2005; 20 in Semester Two 2005.

advised that keynotes for a successful TQP are program flexibility and responsiveness to local tutoring concerns.

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Appendix: TQP Questionnaires 2004 –5

These questionnaires were not designed for formal research purposes. They were used for feedback and planning.

2004 Tutoring Quality Program (TQP) Survey

Which TQP Seminars did you attend in 2004?

Circle as appropriate:

TQP1 TQP2 TQP3 TQP4

What did you enjoy *most* at TQP in 2004?

What did you enjoy *least* at TQP in 2004?

What topics would you like to see covered at future TQP Seminars?

Any Other Comments

Tutoring Quality Program (TQP)
Questionnaire - 2005

1. Statistics

Please place a tick against the seminars which you attended this year

____ TQP1 Wednesday 2 March 2005
What's It All About?

____ TQP2 Wednesday 6 April 2005
Teaching and Learning

____ TQP3 Wednesday 27 July 2005
Making the Grade

____ TQP4 Wednesday 21 September 2005
C*ross-Cultural Communication*

2. Enjoyment

What did you enjoy *most* at TQP in 2005?

What did you enjoy *least* at TQP in 2005?

3. Future TQP Seminars

What content you would like to see in future TQP seminars?

4. Other Comments