Up Close and Pedagogical:

Computing Academics Talk About Teaching

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Abstract

This paper describes and enacts a process for bootstrapping a more systematic discussion of computing education within a school of computing at a research-intensive Australasian university. Thus far, the project has gone through three stages. In the first stage, some academics were interviewed about their approach to teaching. In the second stage, selected anonymous quotes from the interviews were presented and discussed by other interested members of the school at workshops. In the final stage, selected anonymous quotes from the interviews and workshops were placed on a web-based survey, to which interested members of the school responded. These forms of data will be used to drive further stages of debate within the school. The theoretical underpinnings of this project are Wenger's concept of a community of practice, phenomenography, and socially constructivism. 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". As facilitators of this process, the authors of this paper highlighted dialectically opposed views in quotes from the teachers, and then allow the teachers to synthesise those views into a more sophisticated view. Our ultimate project aim is to grow a teaching community that balances reified theories of teaching and learning with participation in a community of practice.

Keywords: Phenomenography, Communities of Practise, Social Constructivist Learning.

1 Introduction

While teaching remains secondary to research in Australasian universities, over the last 15 years great progress has been made in the improvement of university teaching. This improvement has been led by teaching and learning (T&L) units within universities, promulgating a view of teaching from the T&L "canon" [e.g. Biggs, 1999; Ramsden, 1992].

However, despite the profound net positives of this T&L led improvement in university teaching, it has encouraged an implicit view of teaching as an activity where "one size fits all". That is, the coordination of improvements to teaching via a central T&L unit has encouraged a view that there is one broad way to teach well, irrespective of the discipline to which it is applied. However, theory without a context is divorced from its meaning: "Situations might be said to co-produce knowledge through activity. Learning and cognition, it is now possible to argue, are fundamentally situated" (Brown, Collins, Duguid, 1989, p32). It is ironic that, at the same time that academics are becoming increasingly aware of the limitations of the objectivist, transmission-oriented approach in their own teaching, and of the need to encourage students to be active learners, the "education" of teachers via a centralized T&L system has encouraged an objectivist, transmission-oriented approach to staff development, with a resultant passivity among the teachers. In recent years, Ramsden (1998) has argued that the individual academic disciplines need to take greater responsibility for the quality of teaching, via reflection, informed critique, evaluation, and development.

This paper describes the authors' attempts to foster the type of process advocated by Ramsden, within the computing school of a leading Australasian university. The primary mechanism for doing this has been to interview some academics within the school, transcribe the recordings, then use extracts from these interviews to drive further discussion among other interested academics. The authors' motivation for starting this project was unwittingly echoed by one of the academics interviewed:

"I believe a lot of the support that the university offers ... and they do offer a good deal of support to lecturers learning how to lecture ... it's all just words until somehow it works for you."

The authors believe that computing academics will better understand and better implement educational strategies when they have an opportunity to discuss educational concepts with other computing academics, in their own words, from their own experience. Furthermore, the discussion should not be manipulated by the moderators with the aim of arriving at certain "pedagogically correct" outcomes.

In the next section, we describe our method for facilitating debate in the community of practice, our philosophy behind that method, and how it differs from the traditional T&L approach. In subsequent sections, we present the results from applying this method.

2 Method and Methodology

The project has thus far gone through three stages, described in the next three subsections. The remaining parts of this section then go on to describe the theoretical underpinnings of the approach.

2.1 Stage 1: Interviews

Seven academics in the school were interviewed about their approach to teaching. The script for these semi-structured interviews is given in an appendix. Most interviews took over an hour. The interviews were recorded and transcribed.

Only 10 academics in a school of around 50 expressed a willingness to be interviewed for this project. At this early stage of the project, this is neither a surprise nor a concern. If most of the academics had been willing to be interviewed, then there would not be any need for the project. As will become apparent later in the paper, the seven academics interviewed thus far have already thrown up a rich set of issues for debate.

2.2 Stage 2: Workshops

After the interviews had been completed and transcribed, interesting and provocative quotes were extracted from the transcripts. The quotes, without attribution to any interviewee, were then used to drive and focus discussion at two workshops, to which all academics of the school were invited.

Only twelve staff elected to attend the workshops, of which six were interviewees from stage 1. As with stage 1, the low numbers are neither a surprise nor a concern. The academics who attended the workshops were sufficient to generate lively discussion.

2.3 Stage 3: Survey

After the workshops, selected anonymous quotes from the interviews were placed on a web-based survey, to which interested members of the school responded. Only 14

academics responded to the survey, of which 5 had attended a workshop. As before, the low numbers are neither a surprise nor a concern.

Survey respondents provide two types of responses. In one type, they indicated their own level of agreement with the quotes, on a Likert scale. Whenever a quote from an interviewee is provided in the remainder of this paper, the quote is followed by three numbers in angled brackets, indicating respectively the number of survey respondents who agree with the quote, the number who are neutral about the quote, and the number who disagree with the quote. The purpose of these Likert responses is not to determine what views are most popular in the school – with only 14 respondents in a school of 50 academics, we make no claim as to the representativeness of the quotes. Instead, the purpose of the quotes is to demonstrate that there exists a variety of views, even among the 14 survey respondents

The second type of survey response was an open ended response. Respondents could type any comment they wished to make into a textbox. The respondents were not provided with a textbox for every quotation used in the survey. Instead, quotes were organised into themes, and respondents could provide a single open-ended response for each theme. The themes in the web-form are broadly reflected in the grouping of quotations in later sections of this paper.

2.4 Comparison with Trigwell's Method

The authors' method for this project was heavily influenced by a method commonly used within Australasian university staff development courses on teaching and learning, described by Trigwell (1995). In Trigwell's method, academics from several disciplines are brought together to participate in a discussion on approaches to teaching. The discussion is focussed through the use of quotations, which describe the teaching views and practise of others teachers (who are not part of the discussion group). The discussion reaches what Trigwell describes as the "key point" of the session:

"It is at this point that some academic staff claim that it is not possible to teach large classes with a student-focused approach, or will ask for information on how it is done. This is the key point of the session. Overly optimistic, idealistic, or dogmatic responses alienate that faculty who raise this issue. [Instead, we ask] ...other participants to suggest ways in which they go about teaching such classes. Since the range of conceptions and approaches was derived from interviews with actual teaching staff, it is possible that among the group are faculty able to talk about their experiences from such a conception."

Our method differs from Trigwell's method in two basic ways and one philosophical way. One basic difference is that our workshop attendees were all from within the same discipline (i.e. computing). This makes it harder for workshop attendees to reject another participant's view because "it may work in your discipline, but it won't

work in mine". Another basic difference was that some of the quotes used to drive the workshop discussion had been supplied by people who subsequently participated in the workshops. (At the workshops, the quotes were always presented anonymously, but the source of the quotes frequently volunteered their identity.)

The philosopical way in which our method differs from Trigwell's approach is that we do not seek to instruct the academics in a "correct" approach to teaching. We merely seek to foster a discussion of teaching issues. While Trigwell refrains from providing the workshop participant with the "correct" answer, he nevertheless looks for a member of the audience who can provide the "correct" answer.

The theoretical underpinnings of our method are outlined in the remaining subsections of this section.

2.5 Communities of Practice

Wenger (1988) eloquently describes the concept of "Communities of Practice" (CoP). The Wikipedia (2005a) succinctly summarises a CoP as "the process of social learning that occurs when people who have a common interest in some subject or problem collaborate over an extended period".

Wenger describes the dual notions of reification and participation. Reified knowledge is knowledge that has been rendered into some physical form that exists independently of a person. A textbook, for example, is reified knowledge. Wenger describes computer programs as "an extreme form of reification, which can be interpreted by a machine incapable of any participation in its meaning" [p. 64], a view compatible with the concept of a Turing Machine. On the other hand, according to Wenger, "participation refers to the social experience of living in the world in terms of membership in social communities and active involvement in social enterprises" (p. 55)." In participation, knowledge is embodied and socially enacted. It is important to understand, however, that Wenger sees participation and reification as dualities, not opposites, or substitutes for each other.

With regard to this project, theories of teaching and learning [Biggs, 1999; Ramsden, 1992] are reified knowledge, and academics are participating within a CoP as they go about the day-to-day job of teaching. Part of the aim of this project is to alter the existing balance between participation and reification. By interviewing teachers, transcribing those interviews, selecting quotes, and surveying teacher opinions of those quotes, this project reifies some of the participation.

2.6 The Phenomenographic Perspective

In phenomenography, the focus is upon identifying the variation in people's understandings of some phenomenon. (Bowden and Walsh, 1994; Trigwell, 2000).

Within computing, phenomenography has been used many times to study student understandings of computer concepts. Phenomenography has also been used to study computing teachers; specifically to study their understandings of the purpose behind the of teaching of data structures (Lister *et al.*, 2004).

The phenomenographic perspective we bring to this project is the focus on variation. We do not seek to establish what views about teaching are correct, or even the most popular. We merely seek to identify variation in teacher understandings, so we can use that variation to drive subsequent debate.

2.7 Social Constructivism

A key element in our approach is the encouragement of a synthesis of dialectically opposed views (Wikipedia, 2005b). That is, we seek two or more quotes that present opposing views (a theses and anti-theses). At the workshop, we presented such quotes simultaneously. Our hope was that the workshop or survey participants would articulate the different circumstances under which each of the theses and anti-theses were true, thus developing a deeper perspective of teaching within the CoP.

3 People Involved

Table 1 summarises the backgrounds of those academics who participated in the survey[1]. It is clear that one source of variation in the views of teachers are the types of classes they teach. In the small group of academics who responded to the survey, over half the respondents taught in 3rd year or higher, with two-thirds of them teaching elective subjects.

For the course you have chosen to discuss, select the year the course is taught		
First	3	20%
Second	1	7%
Third	8	53%
Fourth	1	7%
Postgraduate	2	13%
Is your course an ...		
Elective course	10	67%
Core course	5	33%
Your course would have about ...		
<50 students	6	40%
50-100 students	3	20%
>100 students	6	40%

Table 1: The Demographics of the Survey Respondents

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[1] One of the survey "respondents" provided little more than demographic data, and did not respond too many of the quotes. Hence, the number of respondents in Table 1 adds to 15, but elsewhere in the paper we frequently refer to the number of respondents as being 14.

The quotes from the interviews were divided into five themes. These themes were presented at the workshop and maintained in the web survey. Those themes also form the following five sections of this paper.

4 What do we expect from the students?

4.1 Mutual Obligation, Passing and Workload

In the survey, in response to questions about assessment, one respondent wrote:

"I expect ... [the students] ... to actively participate in the learning, but I have a responsibility to motivate, encourage and enable them to do this".

Two survey respondents described the following student obligations:

"Read the lecture notes before attending each lecture and ask questions during a lecture".

"Many problems ... [the students] ... experience could be easily solved if they just seeked [sic] help and expressed their concerns early enough, rather than when they fill a survey at the end of session"

Many of the interviewees discussed the need to make learning fun for the students. On interviewee, however, made a provocative statement of a contrary position:

"I think that there's no harm in pushing students to do a lot of work ... [which] ... is perhaps different to other peoples' approaches who think ... that education or learning is a fun experience that, like giving fun examples that's enough, you don't really need to exercise ... I think to learn and to become familiar and develop skill in you need to do lots of work, nothing comes for free". <9, 3, 2>[2]

Despite the author of the quote describing his position as being in the minority, most survey respondents agreed with the above quote.

In many of the interviewees there was the near- implicit assumption that students will only work if they are rewarded with marks. This position was made explicit in the workshop, when one attendee made the following assertion:

"... once you have a continuous assessment mode ... [all teachers have] ... got to be in it, okay. I mean if you're not going to do continuous assessment and everybody else is doing it then your course is going to be totally sacrificed..."

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[2] This note reminds the reader that the three numbers in angled brackets indicate, respectively, the number of survey respondents who agree with the quote, the number who are neutral about the quote, and the number who disagree with the quote.

From the context in which the above quote is taken, it is clear that the participant meant that students would chose to spend less time on the subject that does not have continuous assessment, and thus "sacrifice" it. That assertion led to another workshop attendee asserting a similar but more positive sentiment:

"... there's a whole lot of things you achieve when you have an assignment. One of the things is you ... [force] ... the students into spending more time on your course ..."

That discussion led another participant to synthesise a view that rose above the dialectic of time as a resource that was spent on one subject at the expense of other subjects:

"I think it comes back to this notion of what's a pass? Like how much is enough to pass? I think, with all the time available we've got a budget of 11 hours per course, students spending 11 hours per course should be able to pass. My understanding of the word pass means you've clearly met the course objectives. It's satisfactory; you can move on, you don't need to do this course again. You've mastered what we needed you to learn and then all the other marks are superlatives on top of that but I, I suspect that's not how we actually do hand out passes. You know when we hand out a pass we think oh you get a bad grade, but it really should be you passed the course, well done. ... So I think that we've got a responsibility to make sure that in 11 hours work they can ... do all the assignments, put a reasonable amount of work in each week and get a [pass]."

The following two quotes reflect the view that a "pass" is a genuine but modest achievement:

"If you work diligently on assignments ... you should really get a 60% in assignment without difficulty. The assignments are ... meant really to exercise students to make sure they know the stuff, but they're not really meant to be a barrier of any significant kind." <11,1,2>

"These students are not likely to do it very well but nevertheless we like to see them pass, I mean after they graduate they might actually launch themselves at a different career using their technical background as a base but they're doing something else" <1,3,10>

To paraphrase some of the discussion at a workshop, the following statement was generated by the workshop moderator and inserted as an extra quote into the survey:

"I would like to teach to all the students, but I cannot, so I teach to the middle range, that is most of them"<9,1,4>

At the workshop, that view was opposed by some, who asserted they could teach to all levels (of his first year class), by giving a variety of examples on a topic. The lecture was likened to a performance:

"Like a good play... I reckon a perfect play is one that if you're a connoisseur of plays, you go along and you love it, and if you're intellectual and really clever you get all those witty jokes, and if you like the football there's lots of bums and tit jokes in there and its just all there in a big mess....I think its bloody hard but I think we have a responsibility to try and do it."

Table 2 summarises the results of a survey question: "In preparing lecture material I find I tend to prepare material to focus on the learning approach or conceptual level of ...". Two thirds of respondents pitched the lecture at the pass or credit students.

Pass level students	5	33%
Credit level students	5	33%
Distinction Students	2	13%
All levels of students	3	20%

Table 2: Survey responses to the question on the level at which they pitch their lectures.

4.2 The Lost Art of Note Taking

Most survey respondents agreed (at least, no respondent disagreed) with the following observation by an interviewee, which arose when he lectured from a brief set of notes, and relied on students to take their own notes as he spoke:

"Students don't seem to be used to listening to that sort of lecture anymore ... their own note taking skills weren't good. " <8,6,0>

At the workshop, the above quote provoked an interesting discussion on whether note taking helped students to absorb the material or hindered their capacity to listen to the lecturer:

"I remember ... a company psychologist talking about whether you should be taking notes in lectures. His point of view was you shouldn't be taking notes in lectures because if you are taking notes you're writing and not listening ... "

In response the workshop moderator said:

"There's more to educational theory. If you do two things at once you learn more, so the listening and writing ... will force you to learn something. "

This in turn led another workshop participant to synthesise the two views as each being an accurate reflection of different student "personalities".

An alternative to lecturing from brief notes, and a solution to the alleged inability of contemporary students to take notes while listening to a lecture, is to provide notes:

"I do present quite a lot of slides ... I try to release the lectures before the lecture ... what it does give them is the lecture slides in front of them as I'm talking ... " <11,2,1>

Although many survey respondents indicated that they also present a lot of slides, at the workshop there was some discussion as to whether prepared slides interfere with effective lecturing, which led to the following dialog:

P1: "I now produce you know quite well prepared slides for lectures I think all nicely polished and so on, but my own assessment is that my lectures now are nowhere near as good as when I used to use acetone rolls and I used to write the whole lecture on the spot without lecture notes.

P2: "But I've heard ...if you're writing it then you're slowing yourself down ... to the point that ... you're giving it at, you're pacing yourself. ... Whereas if you flash up a PowerPoint slide ... "

P1: "That's exactly the issue. "

P2: "...they won't take in. "

P1: "It's being thought about in real time and that means they can probably concentrate on it much better because you are too ... whenever I'm actually reading anything off a slide it's not nearly as immediate if you follow as if I had actually pushed myself ... "

4.3 Teaching into a Mirror

One of the quotes presented at the workshop is a good observation to make to any new lecturer:

"When we were student's we were the exceptions. How many of our fellow students are academics now. " <11,1,1>

However, many survey respondents agreed with the following statement:

"I teach as if I am teaching to myself how I would learn" <7, 2, 4>

However, one survey response to the above quote provides an insightful synthesis of the dialectic:

"I think we first teach as we were taught, as we develop we then teach as we would have liked to have been taught, and as we develop further as teachers we realise that there are other kinds of students than the kind we were ourselves. "

5 How we do the teaching?

5.1 Use of textbook and slides

One interviewee made a provocative statement about the writing of lecture notes which met with a mixed response from survey respondents:

"Australasian universities ... have adopted ... this idea of lecturers writing extensive lecture notes and

handing them out to students. I think it's a complete waste of time." <4, 1, 9>

Another apparent negative is the difficulty of working with the slides that come with many textbooks:

"It is hard to teach from someone else lecture slides because a good lecture is telling a story and it's hard to tell someone else's story. Sometimes I stare at a slide and wonder why that material is there." <11,2,1>

A workshop attendee raised the pragmatic issue that often leads to teachers being heavily reliant on a textbook and the provided slides:

"Someone says you've got to do this course you've got two weeks to prepare."

5.2 Teaching Styles

It is well recognized that students have differing learning styles. It is less well recognized that teachers also have differing teaching styles. One interviewee made the following observation, about his unsuccessful attempt to adopt the style of another lecturer:

"I tried to mimic what [a specific popular lecturer] does, but it looked quite faked, because it did not come naturally to me, this is not the way how I think, I am very "sequential". I kind of have to maintain the structure from the beginning to the end, and first year students find it hard to follow it".

6 Support for Student Learning

6.1 Feedback from student

We included the following two interviewee quotes into the survey, believing that they represented antagonistic views, but were surprised to find that survey respondents tended to agreed with both statements:

"I get a fairly good feedback in the lecture as to whether the students are understanding things. I'm more than happy to go into more detail about things or stop, try explaining it a different way and I don't just follow my notes if that's not what's going on and then what I do is if I had to explain it a second way."<10,3,1>

"Marking exams at the end of session can be confronting when you realise how little your students learnt" <8, 5, 1>

6.2 Blue Sky versus Practical

Many lecturers seek to inspire students with visions of the teacher's research work. For example an interviewee who teaches a third year elective, stated:

"The good teaching is often an offshoot of good research ... I bring to the lecture material a lot of the insights from my own research." <6, 5, 3>

Alternatively another lecturer focused on everyday examples:

"I try to firstly choose practical problems to target, mind you it's difficult to come up with small examples that are also practical and are small enough to learn something from ... you're digging into your own experiences and coming up with good examples [and] I think that that helps".<10,3,0>

However another lecturer thought that it is more important to satisfy more mundane student needs:

"One other thing that I reckon does help [my course] rate well is that I answer my email and I think a lot of other academics around here don't ..." <8, 6, 0>

The survey respondents saw all those issues as important.

6.3 Student Motivation – internal vs. external

We used one of the quotes to present the dialectic of students' motivation between internal and external:

"The main emphasis is on motivating them to do it, to have an interest in the material [i.e. internal] and to read more for themselves. ... you really have to in such cases wean them away from this pure concentration on marks [i.e. external] to make them like to learn" <14 ,0,0>

The question is now how do we get this internal motivation:

"... If you want to be a good teacher, you really have to show the students ... that you are passionate about the things you are teaching. The students can very quickly discover the fraud, so you must actually show your love of that material, if that comes across I think half the battle is won. I generally love the things I teach." <14, 0, 0>

However, not even we teachers can be interested in every subject we teach; an issue we pursue in the next subsection.

6.4 The Boring Bits

One participant highlighted the pragmatic dilemma of teaching something in which not even the teacher is interested:

"With third year core courses you are teaching again to people who don't want to learn that material. You can try really hard and prepare a lot of different approaches and ideas, but in the end you give up, at least on some students." <3, 3, 8>

Other lecturers do not give up, but gird their loins, and exhort the students to do likewise:

"... I tell the class that I'm not going to pretend this is really interesting stuff, but it's essential stuff. In the same way that no one ever pretends multiplication

tables are interesting. If you cannot multiply without having to think about it you're in trouble with the rest of your arithmetic." <5, 3, 6>

Another teacher thought that "boring" material can be made more interesting via the right example:

"Most of them would have forgotten that, because it was taught to them in a context which was not particularly interesting. Then I show them this application which is exceedingly interesting ... and many of them find it surprising." <9, 5, 0>

For many students, mathematics is inherently alienating, therefore some lecturers seek to minimize the need for mathematics:

"I had to find a way of explaining these things somewhat qualitatively [while] trying to avoid too much of the mathematics." <9, 3, 2>

6.5 Group Projects

The attitudes towards group projects were mixed:

"So I've never had a problem with preparation from people who are in groups." <4, 5, 5>

"In groups the students get feedback if they seem to be on the right track. This inspires them to keep going" <8, 5, 1>

"In my experience of these things I've generally had, particularly when the students involved in a group project actually perform at a much higher level at the end than they would have performed in earlier years and you know that working in a group has leveraged their interest and ability so I like that." <6,5,3>

Pragmatic issues with group work were raised:

"Mind you I do get one partner complaining about their other partner, they haven't done the bit that they were supposed to do and that they're suffering as a consequence and you know to be honest it is a little model of the real world as well so often students don't like it very much. There are some students that really hate working in groups." <9,5,0>

"Groups can get into the wrong mindset, take the wrong approach and get horridly lost... Also flaming and other critical approaches can be a problem." <5,6,3>

Survey responses to the above quote included:

"Groups work well in my experience when there are no big gaps in skill. They can be horrible when there is one really good student doing all the work and the rest is below average and lazy"

"Even when allocated to groups, students often don't do group-based work; they use groups to partition workload across courses"

"Typically, students can learn a lot from fellow students via discussions. But no student wants to work with a bad student."

In response to questions about allowing students to talk amongst themselves, an interviewee said the following, which was generally not supported in the survey responses:

"The students spend too much time chatting and do not focus ...there is too much material to cover to justify this in this course" <1, 5, 8>

A survey response on group work was:

"I think if there is too much material then perhaps the quality of the learning could be improved by teaching less and teaching it better in a more relaxed way, and if students are chatting and not focusing then we need to work out why and fix it, not just blame them."

7 Delivery Mode

7.1 Why do we use lectures?

We used the following well known saying, which was quoted by one of the interviewees, to provoke discussion at the workshop:

"... you know the definition of a traditional lecture is the process by which the notes of the lecturer are transferred to the notes of the student without going through the brain of either ..." <0,1,13>

However there was a mix of attitudes about lecturing:

"I'm not convinced that standing up there talking in front of slides actually is a great way of communicating the information." <5, 3, 6>

However, as discussed earlier, most survey respondents indicated that they did use a lot of slides <11, 2, 1>.

An alternative was proposed by one interviewee but there was mixed response to this in the survey:

"In this particular course the feedback has been really positive in terms of the project, it was like the project was the thing, so it could've just about done away with the lectures I think ..." <4,3,6>

7.2 Questions in Lectures

Generally most survey respondents thought that question in lectures are a good thing:

"I usually try to cajole [students] into answering [questions] somehow. <10,4,0>

As well as showing support for question asking, the next quote could be usefully given to first year students to encourage a good approach to learning:

"... every answer however stupid it sounds suggests that people can learn from that answer, even if the answer is wrong, to know why the answer is wrong people have to learn from it. " <11,1,1>

Again, while one interviewee was worried about asking questions in lectures, most did not agree with them:

"Questions become a crowd control issues ... you lose their attention ...I discourage questions in my large lectures" <0,2,11>

The suggestion that a lecture can be turned into a tutorial was met with a mixed response:

"[I do a tutorial] in front of the [lecture] class ... where actually I'm doing the tutorial work rather than the class but obviously asking questions of the class as I'm going, but basically I'm doing still the chalk and talk .... it's also a slower pace of information flow" <3,6,4>

7.3 How do we use labs more effectively, or replace them?

In the current cost cutting environment, small laboratory based teaching is under threat, but it is clear that teachers believe they are particularly important part of the learning process, whether the learning come from a tutor or from peers:

"Labs are really one place where students get the most personal attention from staff and if that isn't done appropriately or well then we're really not doing a very good job at all." <7, 4, 2>

"I encourage my lab students to work in groups, I mean pairs generally." <4, 3, 5>

8 Depth versus Coverage

8.1 Problems

There is always the issue of how much can be covered in a course:

"We've got to get through a certain body of material, a certain amount of material which means that you've got to keep moving at a fair clip." <6, 3, 4>

"So one of the things we don't cover in this course is [omitted] and so if people want to do [that] on their applications then they basically have to pick that up by themselves, it's not something we teach."<9, 2, 2>

It would be useful for new lecturers to be informed that not everything students need or want to learn needs be covered in a lecture. Another useful hint to new lecturers is that the lecturer is not entirely responsible for getting the student to pass:

"If students don't play an active role as well in their learning then they will fall behind." <11, 2, 0>

8.2 Solutions

Alternatively there are solutions the lecturers can adopt:

"The main thing in a course like this is ... really to convey concepts which would otherwise be too difficult for them to learn by themselves from text books and to convey insights that go with the material" <12, 1, 0>

"The main emphasis is on motivating them to do it, to have an interest in the material and to read more for themselves ... you really have to in such cases wean them away from this pure concentration on marks to make them like to learn" <9,4,0>

"Doing complex demonstrations loses people, particularly if they can't read stuff so you've got to always be aware of the visual information and how it's being perceived. ... coming up with these good examples from these different directions, different dimensions is helpful."<10, 3, 0>

A survey response to the above quote was:

"Striking and clear examples, not covering too much material too quickly, motivating everything, showing how things are useful, constant revision of concepts already covered"

9 Other Outcomes

We have already highlighted quotes that we felt would be suitable as advice to new lecturers and new students. Apart from the project's continuing role in the development of a Community of Practise, the authors are developing two separate documents which will include quotes that will interest:

1. New academics, by providing advice to fast track their development as teachers, and

2. New students, to communicate what they can expect from their teachers and what their teachers expect from them.

10 Participant Feedback

At the end of the survey, we asked respondents to reply to the following statement:

"You found the workshop very useful, useful, slightly useful, and useless". The responses were respectively 9, 3, 3, 0.

Initially, we were surprised about that collective response, given that only 5 of the 14 survey respondents had actually attended the workshop. We believe that the responses of the 9 who did not attend are a reflection of their view on the process in general, and the survey in particular.

Furthermore, there was an encouraging and unanticipated development at the workshop. Without prompting from

the workshop moderator, one participant asked the following question:

"What I'd really like ... I don't know if it's possible ... infrequently because we're so busy, but regularly ... it would be great if people got together and just talked about teaching, because when do we ever talk about teaching?

After a short discussion, a monthly schedule for such a meeting was agreed.

The proposed meeting activity as described by the participant – "just talk about teaching" - is probably less formal than what the authors of this paper would like to see. The authors would prefer a more structured affair, along the lines of a research group meeting, with a focus on evidence-based teaching (i.e. teaching practice justified by literature and/or empirical results). However, even an informal meeting is a step in the right direction, and a vindication of this project-to-date.

11 Conclusion

We have reported the views on teaching of a small number of academics at one Australasian university. We make no claims as to whether these reported views are representative of computing academics, either in general, or even within the computing community of that university. Nor do we claim that these views are "correct" by some metric (e.g. supported by education literature). Certainly, some of the views expressed are not "politically correct", and therein lays their primary value. The views reported in this paper are provocative, and should generate lively discussion among other computing academics. This in keeping with the authors' phenomenographic starting position: we seek to document the variety of views, not judge the popularity or correctness of those views.

This paper reports on what we hope is the early stage of a long term project. Our long term aim is to create, within the computer education community, a balanced mix of reification and participation (Wenger, 1998, p. 265). That is, we seek to balance formal instruction in good teaching practice, as defined in the relevant literature, with an informal flow of advice and debate between academics. In the work reported in this paper, we set out to record the views of practising teachers because we believe there currently is an imbalance which favours reified knowledge of teaching, as exemplified in popular teaching and learning texts [e.g. Biggs, 1999; Ramsden, 1992]. Any reader of this paper could begin to address a similar imbalance in their own department/school/faculty, by using the quotations from this paper to drive their own workshop and/or survey.

Our very next step in this project is a small one, at least in its execution. We will distribute this paper among interested computing academics within the school. This paper places the project within a theoretical framework that has not yet been discussed with the participating academics. We hope this paper will make our goals more clear, and will encourage them to see the project as cooperative rather than adversarial. If that should happen, then not only will they be encouraged to continue to volunteer their time and opinions, but through an improved understanding of the concepts of reification and participation, together with the phenomenographic principle of capturing the diversity of opinion, they will provide a more sophisticated contribution, and eventually take over the project.

Perhaps the next large step toward our long term goal will be to extend our dialectic approach to include the literature on higher education. We will take quotations from the interviewees, the workshop, the survey respondents, and set them beside statements to the contrary in the popular teaching and learning texts. We will then – within a non-confrontational environment that respects the view of the practicing teacher – gently challenge computing academics to further justify their views. While confronting practicing teachers with pedagogical literature is a common staff development activity of teaching & learning units, our approach is less objectivist and more socially constructivist. That is, we do not seek to convert practising academics to a reified pedagogical position, but instead develop them into pedagogically informed, enquiring teachers who drive a discipline-based community process that will construct a pedagogy of computing.

12 References

Biggs, J. (1999) Teaching for Quality Learning at University. Buckingham: Open University Press.

Bowden, J.A. and Walsh, E. (eds) (1994) Phenomenographic Research: Variations in Method. Melbourne, Royal Melbourne Institute of Technology.

Brown, JS, Collins, A, Duguid, P. 1989, Situated Cognition and the Culture of Learning, *Educational Researcher*, 18 (1), 32-34.

Lister, R., Box, I., Morrison, B., Tenenberg, J., Westbrook, S. (2004): The Dimensions of Variation in the Teaching of Data Structures. *Proc. 9th Annual Conference on Innovation and Technology in Computer Science Education (ITiCSE)*, Leeds, UK, 92-96, ACM Press.

Ramsden, P. (1992) Learning to Teach in Higher Education. London: Routledge.

Ramsden, P. (1998) Learning to Lead in Higher Education. London: Routledge.

Trigwell, K. (1995) Increasing Faculty Understanding of Teaching. In *Teaching Improvement Practices*. 76-100. WRIGHT, W. (ed). Bolton, MA, Anker.

Trigwell, K. (2000) Phenomenography: Variation and Discernment. In C. Rust (Ed) *Improving Student Learning*, Proceedings of the 1999 7th International Symposium, Oxford Centre for Staff and Learning Development. Oxford pp 75-85.

http://www.learning.ox.ac.uk/iaul/Phenom_ISL_paper.
pdf. Accessed August 2005.

Wenger, E. (1998) Communities of Practice: Learning,
Meaning and Identity. Cambridge, England, Cambridge
University Press.

Wikipedia (2005a)   Community of practice.
http://en.wikipedia.org/wiki/Community_of_practice
Accessed October 26, 2005.

Wikipedia (2005b) http://en.wikipedia.org/wiki/Dialectic.
Accessed October 26, 2005.

Appendix: The Script and Instructions Given to the Interviewers who Conducted the Interviews

Introduction:

The questions I am asking are general questions on how you approach teaching and how you provide the material to be learnt to your students. Sometimes the questions may be repetitive or seem trivial in the context of your course but we want to hear this in your words, not assume it ourselves.

What is the name of your subject?

What programs is your course taught in?

Approach to Learning

What do you want the students to learn in your course?

What sort of things do you expect your students should be able to do when they finish?

Do you relate these things you want them to learn to the profession during your course? How?

What do you think is distinctive about your course, compared with other courses in the school?

Are there other related courses taught at this university? How does your teaching integrate or not with them?

What is the main problems students have with your course?

This is not the end of the interview, but is there anything else we have missed that you would like to tell us generally about your course before I get more specific [remember these points and ask about them again in relation to the teaching methods in the following loop]

Presentation of Learning Material

FOR X = each type of presentation of learning material, e.g. lectures, tutorials, labs, assignments, online discussion groups (eg Blackboard, WebCT)-whatever is used in the course.

[Note: If the lecturer does not actually take any tutorial, couch the questions in terms of 'What do you ask tutors to do...'' or "What do you find is done in the tutorials that..."]

DO

Is there a typical structure to all your X's. Why do you do it that way?

Is there something distinctive about your X, compared with other X's in the school?

Do you expect any preparation from students prior to X? How do you encourage this? Why do you think it is important that students do this preparation?

Can you give an example of an X which was the more effective? Why?

Can you give an example of an X which was the less effective? Why?

Can you imagine an alternative approach (eg restructure or use another method such as lab or tutorial) to make your least effective X better?

Do you think it is appropriate for students to talk among themselves as they do X? Why? What opportunity do you provide to support this?

What sort of things do you expect your students should be able to do when they finish X?

What is the main problems students have with X?

How does your X link with your other presentations of learning material (~X)

END;

Notes to Interviewers

1. The aim is to keep the person talking and being as discursive as possible. Do not interrupt to ask follow up questions, let them talk as much as possible and just ask questions if they stop.

2. When you come to a question they have answered before, it is worth asking it still unless they had nothing to say on it (eg it was irrelevant). Introduce the question with "You have already discussed this before, but..."

3. Encourage them that they are saying interesting things, good ideas, and they are doing good teaching. We are not there to judge, and positive feedback will encourage us to get to the root of what different teachers are trying to do in their work.