A Scheme for Improving ICT Units with Critically Low Student Satisfaction

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ABSTRACT
Unit evaluations across many Australian universities indicate that close to 10% of units in Information and Communication Technology (ICT) and Engineering disciplines are flagged as needing critical attention, and as such these faculties often struggle to meet university and national targets on educational performance. Further, ICT and Engineering repeatedly have the highest student dropout rates. This paper reports on the efficacy of activities undertaken to improve teaching quality and student satisfaction. Specifically, this paper outlines a Peer Assisted Teaching Scheme (PATS) as a process that was embedded in the Faculty of Information Technology (FIT) at Monash University to build peer assistance capacity in the faculty to improve student satisfaction of units in need of critical attention.

Categories and Subject Descriptors
K.3.2 [Computers and Education]: Computer and Information Science Education - Computer science education, Curriculum, Information systems education.

General Terms
Human Factors, Design

Keywords
ICT Education, education quality in ICT, teaching strategy, action research

1. INTRODUCTION
A central theme in the Australian government’s agenda for higher education is the quality of teaching and learning in universities [7]. Its importance is seen through three government initiatives: (a) the establishment of the Australian Learning and Teaching Council (ALTC) which is aimed at improving the student learning experience by supporting quality teaching and practice, (b) its recommendation that funding for institutions will be determined, in part, by the measurement of graduate satisfaction with teaching, [8] and (c) the establishment of the Tertiary Education Quality and Standards Agency (TEQSA) to ensure quality is monitored and standards are set and met. As a result of these government measures there has been an increase in teaching quality initiatives, including the development of formal and informal programs aimed at improving teacher effectiveness [12].

Across Australian universities, teaching and unit quality are measured through student evaluations. One evaluation instrument used in this context is the Australian Graduate Survey [4] that comprises two components: the Course Experience Questionnaire (CEQ) and the Graduate Destination Survey (GDS). The CEQ is an annual survey in which universities gather data about graduates’ perceptions of their higher education experience. Graduates rate their course in terms of three broad scales: the Generic Skills Scale, the Good Teaching Scale, and the Overall Satisfaction Item. The GDS collects data about the activities of graduates after the completion of their degrees, regarding their career and/or further study choices.

Many institutions also have their own survey instruments. For example, Monash University has the Monash Experience Questionnaire (MEQ) [15], which is used to identify major areas of the student experience that require attention by the University. At the unit and teacher level, surveys are used to measure unit and teaching quality respectively via the Student Evaluation of Teaching and Unit (SETU) instrument.

The impetus for this paper lies in the national results for the CEQ which indicate that disciplines such as ICT and Engineering do not perform as well as other discipline areas on the good teaching scale. MEQ 2009 data showed that ICT and Engineering were ranked second lowest and lowest respectively on the good teaching scale [16]. Generally these disciplines are rated lowest nationally and repeatedly have the highest student dropout rates. Unit evaluations across many Australian universities indicate that close to 10% of units in these disciplines are flagged as needing critical attention [3].

This paper reports on a Peer Assisted Teaching Scheme (PATS) as a process that was embedded in the Faculty of Information Technology at Monash University to build teaching peer assistance capacity to improve student satisfaction of units. PATS was piloted in units that were in need of critical attention. The efficacy of PATS to improve student satisfaction and teaching quality is reported.
2. BACKGROUND

This section discusses how units in critical need of attention were identified and outlines the scheme piloted to improve them.

2.1 Student Evaluations of Teaching and Units

Evaluations of teaching and student experiences within units and courses are now standard practice in Australian universities. Monash University’s unit survey contains the following five university-wide questions:

- Item 1: The unit enabled me to achieve its learning objectives
- Item 2: I found the unit to be intellectually stimulating
- Item 3: The learning resources in this unit supported my studies
- Item 4: The feedback I received in this unit was helpful
- Item 5: Overall I was satisfied with the quality of this unit

Responses use a 5 point Likert scale ranging from Strongly Agree (5) to Strongly Disagree (1) with 3 representing “Neutral”. Options for Not Applicable (6) and Don’t Know (7) are also provided to respondents but are not counted in the means for questions. Any unit with a median value below 3.0 is flagged as needing critical attention. Any unit scoring above 4.7 indicates that the unit is outstanding.

Monash University has set a target of 5% of units within the physical sciences (i.e. ICT, Engineering and Science) needing critical attention. Figures from 2007 to 2009 unit evaluation surveys show that approximately 10% of units within the physical sciences require critical attention [14]. This problem is a nationwide issue.

The scheme outlined in this paper aims to build peer assistance capacity in the faculty to improve student satisfaction of units. Peer assisted learning (PAL) involves participants facilitating the learning of other participants. [2] suggests that the role of the peer facilitator is more social than the traditional role of learner which is focused on self-learning. [17] defines peer assisted learning as the acquisition of knowledge and skill though active support among status equals or matched companions. [5] argues that PAL has the capacity to allow participants to articulate their understandings about a subject, to negotiate their new directions and to present their developing ideas and arguments. Furthermore, the social interactions and responsibilities associated with PAL programs have been shown to provide considerable potential for enhancing leadership skills among peer tutors [11].

PAL can be situated across the broad spectrum of the higher education system [13], [10], [6] and has been validated across a range of disciplines [1]. Given the positive outcomes reported on PAL for both instructors and participants, it seems reasonable that such a scheme and its positive results might be considered for teaching. Much of the research into improving teaching has been via induction programs with mentors to ease the transition of beginning teachers into full-time teaching [9].

The version of the PAL program used in the pilot applies to academic teaching staff and uses currently recognized outstanding teachers or previous teaching awards winners as mentors.

2.2 The Peer Assisted Teaching Scheme

Figure 1 outlines the PATS process. The process begins with two academics from the same faculty being paired together – one taking the role of a mentor and the other as the mentee. An initial briefing between the teaching fellow and the participants takes place prior to the semester. During this briefing, roles and expectations of the mentor/mentee relationship are clarified.

During the semester, the participant pairs meet to discuss and share ideas on how to improve the unit requiring critical attention. The meetings take place informally over coffee – six vouchers are provided to each participant. Participants are also encouraged to attend teaching workshops where they learn about strategies and methods to improve their teaching. As part of the scheme, participants are required to produce four deliverables: a strategy plan, a backchat session, a peer observation of teaching and a reflection of their end of semester results.

The strategy plan involves the partners identifying three to four key issues within the unit and coming up with strategies to address those issues. A backchat session occurs after the participants have collected informal feedback from their students. The feedback collection can be via an online survey or handwritten during the class. At the following class, the lecturer (mentee) “feeds back” the information to the students and acknowledges how the key issues brought up will be addressed. The mentor and mentee conduct a peer observation of teaching allowing them to reflect on each other’s teaching styles. For the most effective outcome, it is best if both partners take on the role of the observed and the observer. The unit leader’s reflection takes place at the end of the semester and involves reflecting on the unit evaluation results – both quantitative and qualitative, and students’ results. These reflections are captured in a report.

Finally, the PATS facilitator conducts a debriefing session where the participants discuss the PATS process, their own experiences as participants and ways to improve it for future participants.

As a small incentive, if the partners are able to improve their unit evaluation result by 0.5 then both parties receive $500 towards the academic travel allowance.

3. IMPLEMENTATION

This section presents details of the project context and the data collected. The PATS pilot was conducted using only ICT units and ICT academics. It measures changes in student unit evaluation results after PATS, and benefits and concerns PATS participants’ raised.

3.1 Project Context

Eight ICT units (five units in 2009 and three in 2010) that were deemed to need critical attention were used. These units were those that scored less than 3.0 on the university unit evaluation survey Item 5 “Overall I was satisfied with the quality of this
unit”. These units were taught into one of Monash’s University four undergraduate ICT degrees and/or three postgraduate degrees of the Faculty of Information Technology (FIT). The academics were from three of Monash’s six campuses.

PATS was piloted in 2009 with five units (i.e. five partner pair volunteers). In 2010 the project was supported by an Australian Learning and Teaching Fellowship grant and extended to all faculties in Monash’s Physical Science cluster (this included ICT, Engineering and Science). Three ICT units (i.e. three partner pairs) were included in the scheme in 2010.

As comparisons were made from one year to the next, a requirement for participation for the mentee was that the mentee taught the unit in the following year.

The project was approved by the Monash University Standing Committee on Ethics in Research involving Humans (SCERH).

3.2 Data Collection

Three data collections used in this study were:

(a) Unit evaluation results in 2008, 2009 and 2010. These determine whether there were any changes in results after the PATS process was complete.

(b) Surveys of 2009 and 2010 participants. This explored the influence of PATS on staff’s teaching practice. The participants were asked a variety of questions including the time spent with their partner, changes made to improve the unit, and benefits and opportunities of the scheme.

(c) Focus group interviews of 2010 participants exploring the mentors’ and mentees’ perception of the scheme.

During the sessions, a number of topics were discussed including: the recruitment process into the scheme, the ease or difficulty in identifying issues with the units, approaches in gathering student feedback, conducting a peer observation of teaching, building a relationship with partners, positives and negatives of the scheme, and whether the PATS process would be suitable as a professional development component for new teaching staff.

Participants were also asked to write down their answers to the following eight questions:
1. Describe your impression of PATS.
2. How easy was it to identify issues with the unit using a scale of 1(easy) to 5(hard)?
3. Did you gather informal student feedback during the semester?
4. Did you conduct a peer review of your partner’s teaching?
5. Describe your relationship with your partner.
6. Identify something positive about the scheme.
7. Identify a weakness of the scheme.
8. Do you think this scheme would be suitable as part of the Graduate Certificate in Higher Education (GCHE)?

The focus group sessions were recorded and transcribed. The transcripts were sent to participants (after anonymizing) to ensure this was an accurate reflection of the session.

The 2010 participants were also invited to draft a case study of their experience in PATS. These will be included in the production of a PATS guide, used as an information source for faculties wishing to embed the process in their faculty or institution.

4. RESULTS

The findings are presented in two general areas:
i) Changes to percentage of units needing critical attention over a three year period and the areas in units that students perceived as needing attention (sections 4.1 and 4.2)
ii) Participants perceptions of PATS (sections 4.3, 4.4, 4.5)

4.1 Percentage of Units Needing Critical Attention

Monash University has ten faculties. Past results show the Faculty of Information Technology ranked in the bottom half when compared to other university faculties (highest ranking 1, lowest 10). Table 1 shows results from semester 1 and Table 2 shows results from semester 2 over a three year period. It is important to note that comparisons can only be made for the same semester each year as units are typically only offered in one semester.

Table 1. Faculty of Information Technology (FIT)– Semester 1

<table>
<thead>
<tr>
<th>Year</th>
<th>%</th>
<th>Rank</th>
<th>FIT</th>
<th>University</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>9%</td>
<td>9/10</td>
<td>Mean 3.61*</td>
<td>Mean 3.79*</td>
</tr>
<tr>
<td>2009</td>
<td>10%</td>
<td>6/10</td>
<td>Median 3.91</td>
<td>Median 3.94</td>
</tr>
<tr>
<td>2010</td>
<td>8%</td>
<td>7/10</td>
<td>Median 3.93</td>
<td>Median 3.96</td>
</tr>
</tbody>
</table>

Note * - in 2008 only mean values were reported, after that time median values were reported as the mean was deemed not an appropriate measure of central tendency.

Table 1 shows that there has been an improvement in the ranking of FIT from 9/10 in 2008 to 6/10 in 2009 as well as an improvement in median value unit satisfaction rating from 3.61 to 3.91. While the ranking decreased in 2010 to 7/10, the median satisfaction rating increased to 3.93.

Table 2. Faculty of Information Technology (FIT)– Semester 2

<table>
<thead>
<tr>
<th>Year</th>
<th>%</th>
<th>Rank</th>
<th>FIT</th>
<th>University</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>10%</td>
<td>8/10</td>
<td>Mean 3.68*</td>
<td>Mean 3.78*</td>
</tr>
<tr>
<td>2009</td>
<td>8%</td>
<td>8/10</td>
<td>Median 3.90</td>
<td>Median 3.94</td>
</tr>
<tr>
<td>2010</td>
<td>NA</td>
<td>6/10</td>
<td>Median 3.95</td>
<td>Median 3.99</td>
</tr>
</tbody>
</table>

Table 2 shows similar trends to Table 1 for second semester units. In the first iteration of the scheme (in 2009) there were five partnerships participating. Two partners were involved in improving student satisfaction in two undergraduate units, and three partners focused on postgraduate units. In 2010, there were three partnerships focusing on unit improvement in undergraduate units.

4.2 Areas Students Perceived as Needing Attention

Comments on students’ surveys showed areas that needed improvement. However, not all areas applied to every unit. PATS participants typically addressed one of those areas. From the participant surveys, two pairs addressed the lecture organization either through improving the content or linking the lecture to the tutorial material and three pairs addressed the clarity of assessment items. Common areas needing improvements were:

Lectures
The issues students raised in their qualitative comments concerned the content of the lectures, the structure, the use of slides, linking the lectures to the tutorials and the use of time during the lectures.

**Content** – students found there was too much content for each lecture. This created an information overload and students were unable to learn the content thoroughly for assessments.

**Structure** – the structure of the lecture was disorganized and disjointed therefore students found it difficult to follow the information being presented.

**Slides** – students raised issues with the presentation and content of the slides. They expressed concerns over the clarity of the information being unclear and not in enough detail.

**Links to practical material** – there seemed to be a significant content gap between the lectures and tutorials.

**Use of time** – students found the lectures were falling behind as time was not being used efficiently meaning important aspects were skimmed over and not properly covered before tests.

**The Lecturers**
Students were very critical about the way lecturers presented, the level of interaction with the class, students’ consultations and the feedback provided on assessments.

**Presentation** – there were major concerns with not being able to understand what the lecturer was talking about due to language barriers. Also students commented on the lecturers simply “regurgitating” the content on the slides instead of elaborating and explaining the information. Due to a lack of interaction between the lecturer and the students during the class, student failed to feel motivated and excited about learning.

**Consultation** – lecturers did not have enough time to sufficiently consult with students.

**Feedback** – students did not find the feedback provided sufficient, in terms of detail.

**Assessment**
Students found the outline of assessments to be unclear.

**Assignment specification** – there was a lack of specification in regards to the assignments and students found this difficult in knowing the objectives and criteria of the assignment. Many students were stuck as what to do or where to start as a result. There was no clear outline at the beginning of the semester of the assessment tasks and some students struggled with being tested on something they had to learn completely on their own.

**Resources**
The resources, particularly the textbooks provided for students were inadequate and off-campus students had difficulty accessing the necessary resources.

**Textbooks** – students found the prescribed textbooks to be poorly written and difficult to understand. They were heavily worded but without enough useful or relevant information.

**Notes** – students relied heavily on notes provided by lecturers and found that the information given was not substantial in assisting in their learning.

**Off-campus students** – in the lectures, the lecturers discussed the topics with the use of diagrams on a whiteboard which cannot be seen by off-campus students in the online audio lectures. These students also stated that there is a vital need for an online discussion forum to aid in their learning due to lack of face-to-face learning.

### 4.3 Changes in Unit Performance

Table 3 shows the 2008 and 2009 unit evaluation results (overall unit satisfaction Item 5) for participants in the 2009 PATS. All units improved their ratings by at least 0.5 (note: unit codes have been anonymized).

<table>
<thead>
<tr>
<th>Unit</th>
<th>Semester</th>
<th>Median</th>
<th>#Enr</th>
<th>#Rsp</th>
</tr>
</thead>
<tbody>
<tr>
<td>FIT1</td>
<td>S2, 2008</td>
<td>2.86</td>
<td>59</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>S1, 2009</td>
<td>4.33</td>
<td>20</td>
<td>16</td>
</tr>
<tr>
<td>FIT2</td>
<td>S1, 2008</td>
<td>2.11</td>
<td>38</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>S1, 2009</td>
<td>3.5</td>
<td>30</td>
<td>12</td>
</tr>
<tr>
<td>FIT3</td>
<td>S1, 2008</td>
<td>2.95</td>
<td>57</td>
<td>23</td>
</tr>
<tr>
<td></td>
<td>S1, 2009</td>
<td>3.56</td>
<td>49</td>
<td>25</td>
</tr>
<tr>
<td>FIT4</td>
<td>S2, 2008</td>
<td>2.5</td>
<td>24</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>S2, 2009</td>
<td>3.67</td>
<td>30</td>
<td>5</td>
</tr>
<tr>
<td>FIT5*</td>
<td>S1, 2009</td>
<td>4.36</td>
<td>25</td>
<td>16</td>
</tr>
</tbody>
</table>

* FIT5 was a new unit taught in 2009; while the lecturer had not taught the unit before he wanted to be involved in PATS because his previous unit was flagged as needing critical attention (Median: 2.95, Mean: 2.83 (112 students enrolled, 29 responses).

Three of the units (FIT1, FIT5, FIT4) moved out of the critical attention zone (median < 3.0) into meeting aspirations (median above 3.6) whilst the other two units (FIT2, FIT3) moved into the needs improvement zone (median greater than 3.0 but less than 3.6).

Table 4 shows the 2009 and 2010 unit evaluation results (overall unit satisfaction Item 5).

<table>
<thead>
<tr>
<th>Unit</th>
<th>Semester</th>
<th>Median</th>
<th>#Enr</th>
<th>#Rsp</th>
</tr>
</thead>
<tbody>
<tr>
<td>FIT6</td>
<td>S1, 2009</td>
<td>3</td>
<td>48</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>S1, 2010</td>
<td>2.92</td>
<td>40</td>
<td>17</td>
</tr>
<tr>
<td>FIT7</td>
<td>S1, 2009</td>
<td>3</td>
<td>167</td>
<td>64</td>
</tr>
<tr>
<td></td>
<td>S1, 2010</td>
<td>3.28</td>
<td>131</td>
<td>46</td>
</tr>
<tr>
<td>FIT8</td>
<td>S1, 2009</td>
<td>2.5</td>
<td>70</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>S1, 2010</td>
<td>4.3</td>
<td>40</td>
<td>10</td>
</tr>
</tbody>
</table>

One of the units (FIT8) moved out of the critical attention zone (median < 3.0) into meeting aspirations (median above 3.6), another unit (FIT7) moved into the needs improvement zone (median greater than 3.0 but less than 3.6) whilst the third unit (FIT6) remained in the critical attention zone (median < 3.0); this was thought to be because the partnership focused on one of several known issues with the unit.

### 4.4 Positive Benefits of PATS Partnership

Participants provided plenty of positive feedback about being in a PATS partnership. The most beneficial aspect was having the ability to discuss and share ideas in a non-threatening, friendly and relaxed environment. Other positive comments include:

- The scheme being beneficial to students as it aims to increase the quality of the unit for them.
- Providing academics with an opportunity to reflect on their own teaching that may not occur outside of the scheme.
- Providing an opportunity to engage with another colleague that may be from a different area of study/building, etc.
- Expanding professional network.
- Allowing for collaborative, mutual problem solving.
The mentors commented on:
- ‘Gaining personal satisfaction in helping someone who really wants to improve, and makes the effort to do so.’
- ‘Scheme is helpful in having someone to talk to, ask questions and seek advice from’.
- ‘Great having a mentor for support’.
- ‘Provides a chance to share ideas and receive feedback’.

4.5 Concerns Raised by PATS Participants
The main concerns raised about PATS were in regards to being stigmatized as a poor or bad teacher. The majority of the mentees found a sense of stigma associated with being a participant in the scheme. They felt that if other academics found out about their participation, they would be perceived as “bad” teachers. Other concerns included:
- Takes up a lot of time - about 5 days of extra work.
- It relies on the goodwill of participants to keep the scheme going, otherwise there is no point in running it.
- There needs to be better communication in terms of choosing dates and times for meetings, etc.
- Tying the success of the scheme to the UE results and only giving money if there is at least a 0.5 improvement – there are other factors that are overlooked as contributors to success.

5. DISCUSSION AND CONCLUSION
PATS was proposed and piloted to address the need by universities to reduce the unacceptably high number of units that have critically low student satisfaction ratings. The scheme aims to assist academics in improving their unit by using peer support from those peers recognized as excellent. The academics work in partnership focusing on the students’ qualitative comments to make improvements.

PATS raises the profile of learning and teaching in faculties and creates a level of the prestige associated with the pursuit of improving student satisfaction of units. A critical success factor of PATS is the collegial partnership component to identify educational issues within units and facilitate approaches to address these issues. These approaches are facilitated via the sharing of experiences, innovation and good practice in learning and teaching.

It is expected that after the first year, PATS will continue as part of the normal practice for improving teaching and unit curricula across the university. The ultimate goal of PATS is to stimulate strategic change in higher education faculties which have a high percentage of units needing critical attention. Faculties have an opportunity to show leadership in enhancing teaching in their disciplines and provide academics with collegial support to explore new learning possibilities.

After receiving positive feedback from the PATS participants and achieving improvements to all five units in the 2009 pilot, the scheme was supported and funded by an ALTC Teaching Fellowship grant for university-wide implementation. The first phase of implementation covered the Physical Sciences cluster - a quarter of Monash’s faculties, and the second phase (commenced in semester 1, 2011) will introduce PATS into the remaining clusters ensuring coverage across the entire university. This will also provide more data to demonstrate the effectiveness of the program.

6. ACKNOWLEDGMENTS
Our thanks to Australian Learning and Teaching Council Teaching Fellowship (ALTC) for funding to develop a process to build peer assistance capacity across all faculties of Monash University to improve student satisfaction of units.

7. REFERENCES