

Internationalisation and Cross Cultural Issues in Computing Education

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Introduction by Kathryn Egea as panel chair

Prosser and Trigwell (1998) contend that 'teaching with an awareness of cultural diversity is simply good teaching' (p. 170). Biggs (2003) extends this argument indicating this awareness of culturally diverse classrooms in Australia affords better teaching for all students, particularly when academics focus on 'teaching as education' rather than 'teaching as assimilating' or 'teach as accommodating' students from other countries. Strategies that help all students learn support our abilities to be better teachers for international students. Using a student-centred approach to teaching, programs can be designed to support the student to be responsible for their own learning in the new culture, and help them make connections for meaningful learning and thereby achieving the learning objectives of their course. Understanding the needs of learners underpins this focus.

It is with these concepts, that the four papers placed into this panel on internationalisation and cross-cultural issues in computing education are presented. Egea et al. demonstrates a training plan which guides students to reflect on their own ways of learning in team work. Students work individually and in teams (cross-cultural and cross-discipline) to create a web page project as a first year first semester class. The study compares cross-cultural with single culture students for difference of working patterns – there are very few, but cross-cultural teams tend to value relationships and cultural dimensions more strongly than single culture teams.

Awareness of learning needs of the newly arrived Asian student have been identified in the papers 2 (Lu et al) and paper 3 (Xiao et al) where both authors have worked on a large ALTC grant titled 'Strategies and approaches to teaching and learning cross cultures'.

Lu et al report on the current situation of cross-cultural teaching and learning of Asian students in the IT field of Australian universities through a survey in five universities. The large survey across five universities found Asian students learn from textbooks, lectures, learn by rote and memorisation and want group work to be structured by the academic into cross-culture groups. Xiao et al expands this focus from tools for learning to methods of learning particularly for first year students in the discipline of Information Technology. Students from Asian cultures were found to have low levels of confidence in their ability to speak and understand the English language, thereby finding lectures difficult to understand; and have limited confidence to ask questions in class, to participate in class discussions and in their ability to take notes. Presentations require lots of practice and need assistance as does homework tasks.

The final paper (Malhotra and Clear) poses some critical questions about the goals, impacts and sustainability of internationalisation within our universities. Rather than viewing the positive benefit that students have working in an internationalised and global university environment, they argue that increasing student enrolment places pressure on public funding, demanding high productivity with reduced support. Universities have become entrepreneurial. Computing programs are especially popular with the Asian and South Asian student cohort, resulting in an increasingly diverse student body without appropriate teaching and learning support. The key challenge is sustainability, equitable treatment of all students and course integrity. Patterns of relaxed pre-requisites and managerial mandated pass rates are seen to 'dumb down' some courses. This in turn affects the health of the Australasian IT industry and its quality of the future, particular in ICT. The search for and evaluation of responsible and sustainable models of internationalisation may be the new frontier in Computing Education Research.

Keywords: *computer education, globalisation, cross-cultural and cross-discipline teams, internationalisation*

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Paper 1: Influences affecting cross-cultural and cross-discipline teams for a first-year course in web design

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Cross-cultural and cross-discipline teams are commonplace in ICT global work projects, an area where students in an IT program may head. This paper presents preliminary research that is concerned with outcomes from an intervention strategy designed to help first-year first-semester students to work in cross-cultural and cross-disciplinary team tasked with the completion of a series of team-based assessment tasks in a web design course. Using reflective activities (three online surveys), students were guided to explore their own approach and expectations when working in a team. Reflection was combined for each team enabling the team to view their team health, identify strengths and weaknesses, and establish a strategy to improve team working.

The online survey items consisted of both qualitative and quantitative items covering four areas (components) of teamwork: communication, task management, relationship, and cultural dimensions. Response style for communication was text based, while the attributes within each of the other components were to be rated with a 5 point Likert scale. A demographic survey was also developed for indication of gender, age group, cultural influence, country of birth, perceived team membership (members from other countries and members from other disciplines).

With a class of 301 students (semester 1, 2009), 80 teams submitted the final assessment project of a 10 page website. 553 responses to the online surveys were examined for quantitative data on the components task management, relationship and cultural dimensions. The focus of the examination was to identify the differences across attributes within each component for members in cross-cultural or cross-discipline teams with members of single cultural or discipline teams. Study 1 examined attribute ratings from cross-cultural and single-culture teams where the team grouping was based on the student perception of team membership with different cultures (demographic data). Study 2 examined attribute ratings from cross-cultural and single culture teams where the team groupings were based on country of birth (born in Australia or otherwise). Study 3 examined attribute ratings from cross-discipline and single discipline teams based on enrolment data. Study 4 examined attribute ratings from cross-discipline and single discipline teams for four sets of disciplines (Communication, Information Technology, Multimedia and Science/Business/Law). For each of these studies, attributes with significant

difference provided information on different levels of importance for the various attributes, while where no significant level of difference occurred; both groups had a similar focus to the attribute.

It was found that Study 1 had similar ways of working in a team while Study 2 significant differences occurred for two components (relationships and cultural dimensions) where cross-cultural teams rated these attributes higher than the single cultural teams. However, there was no difference for the task management component between both groups. In Studies 3 and 4, significant differences were noted in task management and cultural dimensions (with cross-discipline rating the items higher than the single discipline teams) but not in relationship components. Analysing team results for the teams for significant differences, it was found that cross-discipline teams had much higher marks for teamwork (10% more) than those in single-discipline teams while those in cross-cultural teams had no significant difference in team marks to single-culture teams.

This study therefore demonstrates that when working with cross-discipline teams, a great focus on task management and cultural dimensions is needed in the support material for team training. When working with cross-cultural teams, attention to relationships is significant in resource support. When working with cross-discipline and cross-cultural team, all three areas (task management, relationships and culture dimensions) need support in student training for successful teamwork. The next stage of the research will examine the student reflections on their team health within each of these four areas of study.

Paper 2: Cross-Cultural Education: Learning Methodology and Behaviour Analysis for Asian Students in the IT Field of Australian Universities

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Australian tertiary education has attracted a large number of international particularly Asian students in the IT field. Cross-cultural teaching and learning becomes an important issue in IT departments of Australian universities. This study has completed a questionnaire survey of 1026 students, including 292 IT (28.5%) students from five universities in Australia. Among these IT students, there are 100 (34.25%) local students and 192 (65.75%) international students from 39 other countries (mainly in Asia). The questionnaire contains 55 questions within one information section (Section I) and six question sections as follows: (II) Teaching Contents and

Textbooks; (III) Teaching and Learning Methods; (IV) Education Management Systems; (V) Language; (VI) Culture-based Teaching & Learning Concepts; (VII) Others (open questions). We distinguished local and international students based on the question of where a student completed most of his/her education before studying in an Australian university. Both quantitative and qualitative analyses were conducted to reveal the differences between local and international students in learning methods and behaviours. In this paper, we show the results of comparing the data distributions of a few typical questions related to teaching contents (questionnaire Section II) and learning methods (Section III). To analyse the open questions in Section VII, we categorized international students into two groups: undergraduate and postgraduate students. From the students' comments, key words were identified and grouped. Contents of each group were then summarized.

Through this research, several interesting findings have been obtained. First, Asian background students have specific difficulties in reading/understanding textbooks. Although they believe that textbooks are very important to their study, they cannot read many contents of their textbooks within teaching weeks. Second, some Asian students prefer more lectures and fully use these lecture hours. On one hand, they believe the teachers are authoritative and tend to give up their ideas when conflicting with teachers. On the other hand, they are less confident when challenging their teachers due to their poor English communication skills. Third, students from different cultural backgrounds have different attitudes to working in groups. Although they show similar level of participation in group work, they tend to have fewer different ideas and argue less to show their respect for others. They would prefer that lecturers arrange groups to have local students in their groups. This research also finds that for Asian students, undergraduates rely more on rote learning and memorization than postgraduates. In contrast, postgraduate students participate more in variable teamwork and have better academic achievement.

Teaching and learning in a cross-culture environment remain a great challenge in our current educational systems. This paper reports on the current situation of cross-cultural teaching and learning of Asian students in the IT field of Australian universities through a survey in five universities. The findings of the study will help the universities in making better focused cross-cultural teaching and learning strategies, which will further help the lecturers more successfully teach our international students, and at the same time help our international students more effectively overcome their difficulties in learning caused by cultural barriers.

Paper 3: Challenges and Strategies in Teaching First-year Asian International Students in Australian Universities

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Using the data collected in Paper 2, the focus of this study reveals a number of leaning challenges facing Asian international students in Australian universities. Similar to results from other researches done in Australian universities (Briguglio, 2000 for example), our survey data showed that language and communication skills are still the main burden to first-year Asian background students, though this difficulty rate decreases in the later stages of their university study. The findings from the surveys specific to first year students demonstrate the challenges for teaching international students with Asian backgrounds:

1. Use of English language
 - 36% of international students are not confident in using English language
 - more than 50% of international students felt difficulty in communicating to others (students or staff);
2. Lectures
 - more than 20% of international students do not understand lectures or cannot understand lectures most of the time;
 - 32% international students have difficulties in taking notes during lecture;
3. Homework
 - nearly 50% international students need some help in completing their homework;
 - about 7% of them even need to translate into their first language before attempting the homework;
4. Classroom discussion
 - more than 50% international students are not very confident in their English when participating in classroom discussion,
 - nearly 10% students are not confident in their English at all thus they do not participate in classroom discussion.
5. Presentations
 - about half of international students can do in-class presentation after practice,
 - more than 11% international students need help from others for their in-class presentation.

[It is noted that nearly 90% of local students have no problems with their in-class presentation skills.]

Interview data was also collected. Staff from Edith Cowan University generally supported the above findings from the survey questionnaire. Asian international students indicated that they were reluctant to speak in lecture/tutorial sessions and/or in class discussion in their first year of university study as they did not feel confident; their spoken English was not as fluent as that of local students; they were shy about speaking up; they did not want to challenge their lecturer, and so on.

Both the survey and interview results showed the need to improve international students' English language ability, especially in their first year study at university. While this is a complex issue, most students and staff agreed that while university level English classes are provided to support international students, teaching activities can be designed to help international students develop their English ability.

The authors suggest the following strategies to improve the learning environment for the international students:

- (1) For lecture/tutorial sessions, lecturers should invite specific international students to participate in discussion or asking/answering questions, after giving adequate time for them to reflect on what to say; encourage international students to respond to in-class discussion from both the teacher and fellow students.
- (2) Lecturers should be encouraged to mix local and international students when forming groups or make a structured intervention for forming groups wherever possible.
- (3) Lecturers should set aside one-to-one consultation time, or provide office hours for clarifying and explaining material that students did not fully understand in class
- (4) Lecturers should encourage face-to-face consultation instead of answering questions via emails

Paper 4: Yet Another East India Company? The Australasian Education Industry

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In this presentation the authors pose some critical questions about the goals, impacts and sustainability of internationalisation in our Universities.

At the macro level, demands upon tertiary funding in Australia and New Zealand are key drivers for internationalisation. Increasing student enrolments and participation in tertiary education have placed pressures upon public funding of the system, and

brought demands for higher productivity with reducing support. Clark (2004) has noted these trends are not unique to Australasia. Universities in many countries, seeking to retain their autonomy and viability, have adopted a number of entrepreneurial responses, frequently with government encouragement.

In New Zealand for instance 'export education' for 2007/2008 (mostly generated by foreign fee-paying students), contributed NZD\$2.1 billion to the economy, with 32% of that coming from the university sector (Infometrics, 2008, pp. 1-2). This value at 1.2% of GDP, equates roughly with that contributed by dairy farming at 1.3% of GDP (p.4), and positions export education as a major industry. Explicit government support is given in a recent tertiary education strategy:

The flow of international students can boost the incomes of New Zealand institutions... We will review policy settings to ensure that international education can maximise its contribution to New Zealand's economic performance (MoE, 2009 p. 9).

Challenges for Computing Educators

Computing has been an especially popular discipline for students from Asian and South Asian countries. As a result most Australasian computing educators are now teaching an increasingly international and diverse student body. But on the front-lines individual educators facing large numbers of international students in their classes are challenged with managing equitable treatment of students, both domestic and international, while maintaining the academic integrity of their courses.

These are now key challenges facing computing educators and their institutions. How we deal with these is critical for the sustainability of an internationalisation agenda, and the reputation of the Australasian higher education sector. However the delicacy of the associated issues of access, quality, equity, race and culture ensure that this topic is one that one reviewer has termed an "elephant in the room".

For an 'industry' of this significance, where is the research into the impacts on those working in the system, the perceptions and experiences of the students and their parents, and the future prospects for productive and mutually reinforcing partnerships?

The academy may fearlessly research questions outside its own walls, but with the growing marketing phalanxes guarding its own reputation and branding, can it really say it is open to honest scrutiny of its own 'business' affairs?

Steady State or Impending Crash

Are we witnessing a sea-change in the Australasian University landscape with a much broader and sustained regional and national outreach which will truly include sound partnerships with the "Asia" within its name (unlike this conference for instance)?

Or are we merely seeing the flush of a boom not far from an impending major crash of our own doing, which will have severe impacts on our national higher education systems?

At the institutional level an internationalisation strategy can be implemented well or badly. In the worst cases the “sheer financial opportunism” slated by Clark (2004, p. 17) and which has embarrassed several UK universities, results in inadequately prepared students struggling to succeed, and institutions ‘dumbing-down’ courses to accommodate the capabilities of the anonymous hordes of students they have accepted.

An accompanying pattern of relaxed prerequisite structures to ease access for international students especially at the postgraduate level, and managerially mandated high pass rate targets (cf. Clear, 2008), further exacerbate the situation. Unfortunately the confusion between educational performance metrics such as retention and progression rates and assurance of educational quality, often serve at a department or institutional level to cloak the true nature of the problem.

While Edmund Burke observed in 1786 that the East India Company, in short, was “a State in disguise of a Merchant, a great public office in disguise of a Countinghouse” (cf. Murray, 2007), the financially opportunist modern University can equally be termed nothing more than “a Merchant in disguise of a State institution”, exploitatively seeking to lure foreign fee-paying students.

This in turn leads to wider social impacts, nicely captured in a news item in *The Australian* newspaper:

Dr Birrell argued the appeal of permanent residency and lax rules for skilled migration delivered strong growth in business and information technology courses at universities in the early 2000s...But the education business had come to distort the migration program, producing graduates ill equipped or uninterested in the jobs they were supposedly trained for (The Australian 25 July 2009).

Anecdotal evidence through personal feedback to one of the authors, suggests that the reputation of Australasia as a destination for high quality education may already be suffering in such major markets as India.

Frustrated Parents

The Australian author heard a level of anxiety and frustration among the parents of the graduated students as they wait for their children to get gainful employment in the area of their specialisation and education. An employment in a developed country is necessary to repay the educational bank loans that the middle-income parents have guaranteed in the hope of better future for their child in Australia. An inordinately large time gap between graduation and employment for many international students, as compared to the domestic students with similar academic achievements, gives rise to fears of

discrimination and racism among these financially stressed families as they pay interests on the loans.

Yet the author did not hear any parent wondering about the improved academic grades of their child as compared to their record while they studied in India. The Indian employers, however, remain more circumspect and are not willing to treat many foreign degrees at par with those from the best Indian Universities and institutions. Cervin (2009) in the *Age* newspaper reports ensuing softening of demand for Australian education in India.

The emotional and socio-economic aspects of international education must be given equal consideration in a sustainable model for the education industry.

Sound Institutional Strategies

Globalisation can be seen as one component in a wider “discourse of enterprise” whereby the social realm is defined in economic terms, and “patients, parents, passengers and pupils are re-imaged as customers” (Clear, 2002). This is far too narrow a view to sit easily with the reality of a reputable University, which needs to counterbalance it with the “discourse of community” (ibid.), where broader societal and ethical responsibilities must co-exist with more commercial ones.

Burton Clark (2004) arguing for the inevitability of ever reducing public funding for Universities, suggests that five elements must be considered for an institution embarking upon a transformative pathway to self-reliance as an ‘entrepreneurial university’. These elements address:

- 1) diversified funding base
- 2) strengthened steering core (e.g. balancing the central, departmental and individual academic interests)
- 3) elaborated developmental periphery (e.g. grants offices, capital projects office, conference and special events offices, with a development orientation)
- 4) stimulated academic heartland (more postgraduate higher quality students and research intensity. And, also continuing education, professional development, contract education)
- 5) integrated entrepreneurial culture

The implementation of an internationalisation strategy by different institutions varies widely. The study of Monash University by Clark (2004, p. 122) provides an interesting example of the ‘entrepreneurial university’ in action. He concluded that Monash had strengthened its steering core through a managerial approach, and had diversified its funding base, but had damaged the academic heartland by engaging in merger activities at the cost of research and its international outreach had resulted in a diffusion of resources into teaching and alliances not closely linked to research. Moreover this managerial approach had damaged the “Ambitious

collegial volition” (ibid.) that was necessary to sustain change.

A Role for Computing Educators

This latter collegial role is the one we must actively assert, as educators and researchers standing before our classes. We must actively work collegially, and strive to set and maintain high standards. As a community with more exposure to international students than most, we should look for opportunities to link research with the internationalisation agenda within our institutions and feed that into better informed and more strategic decision making processes. We must find the courage to resist financial opportunism girded by heavy-handed, short term managerial actions with likely damaging longer term consequences.

The health of our institutions, the quality of our futures and that of our IT industries depends upon approaches driven by strategies aimed towards quality. Perhaps a positive sign in the ‘offshore education’ segment is appearing in New Zealand, “which may now be entering a phase of more strategic choices, based on feasibility studies, business case analyses and effective due diligence” (Infometrics. P.12). At a broader level the quality of our choices has the scope to impact upon the stability of significant segments of our economies, now so dependent on the ‘export education’ industry.

The search for and evaluation of responsible and sustainable models of internationalisation may be the new frontier in Computing Education Research.

Biographical information

Dr. Tony Clear is Associate Head of School, Computing and Mathematical Sciences at AUT University, New Zealand. His research interests are in Computing Education Research, Collaborative Computing and Global Software Development. After an early career in industry as a practicing software developer and manager, and following a ten year programme of research into global collaborations, he has recently completed a doctoral thesis investigating *Technology-use Mediation in Global Virtual Teams*. Tony holds positions as a Column Editor and Associate Editor for ACM Inroads; Editorial Board member for the journals *Computer Science Education & NZ Journal of Applied Computing & IT*; program co-chair Australasian Computing Education Conference 2009 & 2010. In 2008 he was a guest researcher at Uppsala University Sweden. Tony has been engaged in global virtual research collaborations over the last decade spanning the continents of Europe, Australia, Asia and the United States.

Dr Kathryn Egea is the first year coordinator for students in the Bachelor of Multimedia Design and Bachelor of Information Technology in the School of Information Technology and Electrical Engineering at University of Queensland. Her research areas include teamwork and virtual working, particularly in academic assessment, computer-based diagnostic test designs for mathematic education, and adult learning in computer education. She is a member of the state board for the Australian Computer Society where her focus is young professional career pathways. She has won several faculty and university level grants in teaching and learning towards teamwork, most recently connected to cross-discipline and cross-cultural teams in first year.

Professor Jie Lu is the director of Decision Systems and e-Service Intelligence Research Lab at the University of Technology Sydney, Australia. Her main research interests lie in the area of multi-objective, bi-level and group decision making, decision support system tools, uncertain information processing, e-Government, e-Business and e-Service intelligence and cross-culture education methodology. She has published five research books, over 200 papers in refereed journals and conference proceedings. She has won four Australian Research Council (ARC) discovery grants, one ALTC (Carrick) competitive grant, and many other research grants. She served as a guest editor of special issues for five international journals, and delivered four keynotes in international conferences.

Dr Jitian Xiao is a senior lecturer in the School of Computer and Security Science at Edith Cowan University. He completed his Bachelor and Master degrees in China and PhD at the University of Southern Queensland. His research interests include databases and large data warehouses, spatial data

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