

New Arrival Students: Mitigating Factors on the Culture of the Computing Learning Environment

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Abstract

Over the past decade Australian and New Zealand educational institutions have experienced a rapid increase in the numbers of “New Arrivals” - immigrant and international students who leave their home country and study abroad. Studies have found that many of these students encounter problems adjusting to living and studying in their host country as well as experiencing difficulties in their learning environment. A significant number of New Arrival students enrol in computing programmes and have traditionally formed a minority subgroup in their learning milieu. Females are another minority subgroup in computing and research shows that the culture of the computing learning environment has been influential in many of them feeling alienated and contributing to the disproportionate female representation and retention in tertiary computing programmes compared with males. At the same time that New Arrival students are coping with living and studying in a new culture, they will also face adjustment to the computing culture. What are their perceptions of their learning climate? This paper reports results of semi-structured interviews that examine how New Arrival tertiary students studying first-year programming perceive their computing learning environment. The study was conducted at three tertiary institutions in Wellington. It was found that the majority of students perceived their learning milieu positively. They were satisfied with the personalised teacher-student relationship and made favourable comparisons of their New Zealand learning milieu with that which they had experienced in their home countries. The maturity and experience of these students, together with the context within which computing was taught, appeared to be positive mitigating factors on the culture of the computing learning environment. However for the few younger students who did not enjoy the same personalisation and had difficulties with the English language and culture, there are implications for educators and administrative staff of institutions interested in providing a positive learning experience for New Arrivals.

Keywords: Learning environment, international student perceptions, foreign students, higher education, student

adjustment, CUCEI, computing culture, tertiary programming.

1 Introduction

How do New Arrival first-year tertiary programming students perceive their computing learning environment? This presentation reports results of semi-structured interviews that are part of a larger overall study of the learning environment in tertiary programming classrooms. In this study survey data was obtained from 125 sets of the Actual and Preferred forms of the College and University Classroom Environment Inventory (CUCEI), observation was conducted over three months and interview data obtained from 28 students.

2 Background

Research indicates that the cultural and social climate that students experience in the tertiary computer learning environment is an influential factor in the low participation rate of women in computer science and, to a lesser extent, information systems programmes. Attention has centred around the attributes of the computing culture which have been identified as the attitudes towards computing (Grundy 1996, Ryba and Selby 1995), users' relationship to computing artefacts (Bowers 1988, Margolis and Fisher 2002), the language of computing (Bernstein 1999), the masculine image of computing including stereotypes (Clarke and Chambers 1989, Ryba and Selby 1995, Toynbee 1993, Zuga 1999), critical mass (Byrne 1993) and the institutional context (McLennan, Young, Johnson, and Clemes 1999, Sproull Kiesler, and Zubrow 1987). It is clear, then, that for the female minority subgroup, the computing culture impacts on their learning experience.

Another minority subgroup is one defined as New Arrivals – international students who go abroad for study and immigrant students whose education has been mostly in their own country and are enrolled in educational institutions of their new country. These students are of diverse nationalities, culture and educational backgrounds. In recent years the Australian and New Zealand governments have encouraged and supported “export education” (Beaver and Tuck 1998, Maharey 2000), recognising the significant positive economic contribution (Bartlett 2001) made by international students. Statistics for New Zealand show the strong momentum of the internationalisation of tertiary education. The number of foreign, fee-paying public tertiary students increased from 3,945 in 1994 to 11,498 in 2000 (Ministry of Education 2001). These figures do

not include immigrant students or students who were born and educated overseas, have permanent residence status and enrol in tertiary education.

Studies have established that a positive learning environment is influential in student achievement and attitudes (Goh 1994, Fisher, Henderson, and Fraser 1995, Wubbels and Levy 1997) and this environment is as important for tertiary students as it is for those in the earlier years of education (Chalmers and Volet 1997, Tinto 1993). Moos (1976) believes that subgroups experience social environments (such as classrooms) differently and this experience impacts on and affects human functioning and development. The social environments may limit behaviour and actively stimulate some forms of activity which may suit one group but not the others. In addition, social environments may provide the conditions where there is selective favouring of preferred modes of adaptations, thereby facilitating the development of some individuals over others. This could create stressful conditions, which retard development for a subgroup.

An anthropological perspective that contextualises learning in a cultural milieu for science education has been posited by Cobern and Aikenhead (1998). They reviewed literature on multicultural and cross-cultural science education where students have “studied in non-Western countries or in indigenous societies, or with students who comprised minority groups within Western countries (i.e., groups under-represented in the professions of science and technology)” (p. 40). Research of the experiences of these student groups has found that they have more problems, and experience them to a more serious degree, than students of the home country.

The New Arrival students bring to their learning their own cultural background and influences. They therefore experience the learning environment from a multi-cultural and cross-cultural perspective while studying within the computing culture as a minority group. Many of these students are academically very successful (Gallard, Viggiano, Graham, Stewart, and Vigliano 1988) but some will find the shock of a new culture detrimental to their learning. They will each be coping with their own “border crossings” (Cobern and Aikenhead 1998) into the computing culture. As educators, we need to be aware of how this multi-cultural subgroup perceives the learning environment so that we are better able to provide a first-year learning climate which meets their needs

3 Method and Analysis

The overall study used a mixed-method design (Greene, Caracelli, and Graham 1989). Data was collected by administering an existing survey instrument, the College and University Classroom Environment Inventory (CUCEI), observing teaching and learning in classrooms, lecture theatres and computing laboratories, and conducting student and lecturer interviews. The CUCEI assesses participants’ perceptions of the social climate of their learning environments and focuses on general psycho-social characteristics, based on Moos’ (1979) social climate domains of Relationship, Personal Growth or Goal Orientation, and System Maintenance and Change. These three domains encapsulated dimensions

which characterised, and contributed to, the “climate” of a diverse range of environments such as prisons, school classrooms, hospital wards, military companies, university residences and work milieus (Moos, 1979) and have been linked in indexes of morale, self-confidence and well being as well as academic performance and behaviour (Moos 1991). The scales that dimensionalise the domains and upon which items of the CUCEI (and many other instruments for assessing educational environments) are based, are Personalisation, Innovation, Student Cohesiveness, Task Orientation, Individualisation, Cooperation and Equity. These scales provided a framework for the questions used in the semi-structured interviews, the results of which are reported in this paper.

The majority of the semi-structured interviews were held with two or three people at a venue at their institution and lasted between 30 and 70 minutes. All participants agreed to the interview being audio-taped and assurance was given that the transcriptions would be done using pseudonyms to preserve confidentiality.

The verbatim transcripts from the interviews provided a full record of the dialogue and conversation of the meetings. Before commencing coding of the transcripts, an organizational tree structure of categories was created based on the scales of Moos’ (1979) dimensions (as discussed above). Themes emerged that related to the dimensions as well as additional themes and these formed subcategories and sub-subcategories. A computer programme, QSR NUD*IST, Version 4 (1997) was used to aid analysis.

The analysis of the interview data began with identifying comments that related to each of the seven CUCEI scales. The comments for each scale were typed into table format (under column headings of Positive and Critical), read, and then separated into themes which became the sub-categories. Sometimes the comments were a mix of both positive and critical, such as a criticism of a certain practice or event followed by a suggestion of how things could be improved. In this case, the comments were cross-referenced to both the positive and critical categories and during analysis the original transcript was re-read to refresh contextual understanding.

A discursive analysis (Nash 1976) was used as a way of presenting results. This involved the reasoned categorisation of themes (based on the dimensionalised scales) and presentation of students’ responses in verbatim form. This approach provided a way of reflecting students’ responses in a “raw” form, as they were spoken, thus attempting to provide a true picture of the interviewees’ intentions.

3.1 Sample Description

Students studying first year programming at three Wellington tertiary institutions were invited to participate in the study. A sample of 125 students completed the Actual and Preferred Versions of the CUCEI in the last semester of their first year of study. For the interviews, a purposive sample (or judgment sample) (Frankfort-Nachmias and Nachmias 1996) was selected, based on the categories of gender and New Arrivals. The focus of analysis reported in this paper is on perceptions of the

New Arrival subgroup students. Of the 36 students selected, a final sample of 28 (15 of whom are New Arrivals), attended the interviews which were held towards the end of the semester. Almost equal numbers of New Zealand and New Arrival male and female students (eight male, seven female) participated in the interviews.

4 Results

Many of the student responses to the semi-structured interview questions revealed a broad concern with equity issues. Students viewed equity from different standpoints that included how equally the teacher treats students when responding to questions, helping, praising and encouraging students (covered by items of the CUCEI's Equity Scale). However additional issues were raised, the themes being language and culture, collaborative work, being a minority, racism, equal treatment and personalisation by the teacher, enrolment policy, course content and differences between countries. Each of these themes are described and illustrated with presentation of students' responses, as they were spoken. The bracketed data after the quotation indicate the student's name (a pseudonym), sex, institution and age in years.

4.1 Language and Culture

Expressing oneself in a foreign language was identified as a problem by several of the New Arrival students. For Viri, studying in English did become easier but initially he viewed his competency in English as a problem, contributing to his shyness and inhibiting his participation in class.

"Main problem here is the language. Other thing is if you can speak good English then you can express yourself if you have problems. What's hard here is I was shy to ask in front of the class; now it's easy but I know what I face when I first started here." (Viri, M,C,24).

There was consensus amongst many students that studying programming in English was easier than studying other subjects that required a greater competency in the written usage of English and an understanding of a wider range of concepts.

"It's easier for me to do programming than other subjects because I spend much more time on other subjects because of language." (Zhou, F,A,41)

"Me too; programming is not as difficult as other subjects like Systems Overview or more English-related subject." (Subako, F,A,37)

For some students, studying in a different language presented challenges which forced them to become more independent learners, thereby lessening their dependency on the lecturer and tutors.

"When I have difficulties I had to read a lot and find out on my own when I did have problems." (Reni, F,B,35)

"I just go into books and read heaps of things and try and figure out the basic thing ... " (Mani, F,A,20)

"I usually thinking by myself; I find it best." (Zhou, F,A,41)

"... just get on the internet and search and ... see how others have done it. You have to be good at programming

to understand others' code; the hardest part is to understand other people's [code]. (Khalid, M,B,34)

The loneliness of arriving in a new country and coping with a strange culture, difficulty with the language, as well as the computing subculture was experienced by two young Chinese male students who during the interview, looked and sounded very unhappy. They said:

"I have no kiwi friends." (Zhang, M,C,19)

"Yeah, but always just face-to-face with computer and you talk to someone and they say ok, you can just do yourself. Not really student help." (Wen, M,C,20)

Another young Chinese student at a different institution also found initial difficulties.

"Before I enrol in this course I was scary; I didn't study in China before.... I read the book and it's all right at the moment" (Ming, M,A,23)

4.2 Collaborative Work

Language was identified as a barrier to collaborative work with New Zealanders who were reported as being reluctant to work with New Arrival students, especially in group assessments.

"We had study group with all foreigners, no Kiwis" [New Zealanders]. (Reni, F,B,35)

"Sometimes when doing a group job I feel not comfortable. Native people don't like to do the job with us – Interpersonal Skills group project – because our language is not good." (Zhou, F,A,41)

Language was also cited as a problem for some New Arrival students of the same ethnicity when they needed to communicate with each other when working together in study groups. Lui came from China and found it difficult to communicate with Hong Kong classmates because of the different dialects amongst them

"I have two Hong Kong classmates; problem was a problem of language" [with other students]. (Lui, F,B,27).

Too much collaboration, especially when working on assignments which were to be graded, was a worry for Khalid, an Egyptian engineer and a successful mature programming student. He resented continually helping students, saying:

"I'm a student still so I'm not so creative to do more than four ideas ... so I'm helping students who are struggling; I'm giving him my ideas so when they hand in the work it looks suspiciously similar ... " (Khalid, M,B,34)

4.3 Being a Minority

The female and New Arrival students formed minority subgroups. They were asked if their minority status had affected them in any way. Some females said they had noticed and wondered, "why less ladies here?" (Ravi, F,C,19), but they thought this had not impacted on their learning. There was a consensus that it "doesn't matter" with Reni saying

I don't think it depends on gender. It's whether you like it and grab the information. (Reni, F,B,35)

Subako (F,A,37) was "very comfortable" and Zhou (F,A,41) said her minority status didn't affect her "at all". One young New Arrival student provided reasons for

finding that her minority status did not “affect me that much”.

“Most of the students are mixed cultures so I could fit into them; especially original Kiwi people didn't care I was from another country. I found it very easy to talk to them because most of them were mature students so we could have a meaningful conversation without talking rubbish.” (Mani, F,A,20).

Another female cited background and experience as reasons for being happy with her minority status. Reni (F,B,35), a student from India, felt her experience helped as her background included doing a Masters in Agriculture in Russia where the majority of students were male and she was “used to it”.

Khalid was surprised at the suggestion that he was considered to belong to a minority category and stated:

“I'm from Egypt; I'm not a minority. We are the original.” (Khalid, M,B,34)

When asked what he meant by this he explained that the Egyptian civilization was centuries older than New Zealand's and compared with his country's history, achievements and culture, it didn't occur to him that New Zealanders might consider themselves superior to someone coming from that background.

Most of the New Arrival males considered their minority status was not a problem for them. The positive attitude of many of the students in this subgroup demonstrated by their willingness to participate in a new culture possibly contributed to this pleasing and surprising response.

4.4 Racism

New Arrival students were asked if people in their learning environment treated them differently because they were from another country. This was sometimes followed by a blunter probe of: “Have you experienced any racism?” Reni, (F,C,35) responded, “Not a worry; haven't been treated differently, no racism.” Similar sentiments were echoed by most of the New Arrival subgroup students and it appears that the attitude these students bring to their living and studying in a foreign country helps with their adjustment. For example, Rita (F,B,41) reported that she had experienced “certain instances, certain looks; minor, but it didn't affect my learning”. Ming was interested to learn about the new country he had come to and made an effort to be friendly and approach his New Zealand classmates. He noted that he had to take the initiative in engaging New Zealanders in conversation.

“It was easy because I also want to understand what makes their culture and sometime I find some chance to talk with them but if I don't then no one would talk.” (Ming, M,A,23)

Min, a father of four children and an ex-mathematics teacher from Sri Lanka, said he was pleasantly surprised at how accepting the younger New Zealand students were of students his age.

“In my country, if I go and study with the younger, they will laugh and say what's this old man but here, I didn't feel anything about this.” (Min, M,B,42)

Another factor which possibly contributes to the low level of racism these students say they experienced is the location of the tertiary institutes. Wellington is New Zealand's capital city with a large multicultural population. It is possible that overseas students attending institutions in New Zealand's towns and cities with less ethnic diversity would not find a similar situation.

4.5 Equal Treatment and Personalisation by the Teacher

Many students were happy with their perception of the teacher's equal treatment of students. They commented: “yes, we could ask questions” (Ravi, F,C,19) and “they give a chance to everyone to say” (Viri, M,C,24). They also appreciated a teacher who was well-organised and who made explicit, in an open and obvious manner, the expectations for work to be covered within a particular time frame. An appreciation of how approachable and accessible the lecturer was is illustrated by the following comment.

“The tutor was so good because when you raised your hand he always acknowledge us and always divided some time and always make sure to go to everyone and so he always covered the class.” (Subako, F,A,37).

This student not only reflected positively on the personalisation aspect of the tutor's actions but commented on how the tutor ensured fairness in managing a class of individuals so that everyone had an opportunity for one-to-one contact.

However three male New Arrival students from Institute C had concerns about their lecturer's attitude and Wen described how it impacted on him.

“Teacher not very friendly; he stands at the back but he didn't help me; he talks to some Kiwi. I think he talking by himself; I didn't understand” (Zhang, M,C,19).

“I feel the same; we give up. Most of the time depend on myself; no one to help me.” (Wen, M,C,20). “You have to call them five or six times and then they come to you and just do it; you can't see what he is doing; it's not good.” (Viri, M,C,24).

4.6 Enrolment Policy

There was criticism of the (virtually) open entry enrolment policy for the certificate program. Khalid believed that some of the students accepted into the certificate program were ill-prepared, found studying difficult, and these factors contributed to the poor success rate.

“Management will not accept only good students; they take anyone so it's money; one third drop out, one third fail and one third pass.” (Khalid, M,B,34)

4.7 Course Content

While there were many aspects of the learning environment that students found favourable, they identified areas that were perceived as unsatisfactory and which could be improved. One student objected to the ‘monkey see, monkey do’ approach to teaching.

“There is no programming on putting a button on – any child can do it ... what the hell, it's like teaching babies;

they didn't teach me; they give me a handout book. If I put it aside I will not be able to do it again." (Khalid, M,C,34)

Another student had similar views regarding the text:

"The text was step-by-step which wasn't any good because you didn't have to think and there was no understanding. The steps should be guidance and some examples." (Reni, F,B,35)

However, at another institution there was appreciation of a different text that was used in combination with additional lecturer material

"The textbook was really good and the lecturer extended it more; it was a good mix." (Zhou, F,A,41)

Students valued "real world" exercises and believed they were not being provided with this

"[The teacher should] speak more about real exercises which are useful in the real world; very difficult for us at the very beginning. Some knowledge is book-related; lacks practical experience." (Lui, F,B,27)

More practice and repetition was recommended

"They [the students] need more practice with lots of repetition; lots of examples ... we need preparation in logical thinking." (Milo, M,A,41)

4.8 Differences Between Countries

Students were asked if there was a difference in teaching approaches between their home and host countries. Responses related to the practical application of knowledge, the student-teacher relationship, noisy classrooms and the nature and type of assignments.

"I hear Sri Lanka is now changing but here is more practical; they have to apply the knowledge. In Sri Lanka, not that much." (Reni, F,B,35)

"I like the method here because in China not so much practical knowledge. In university I studied theory/book knowledge, not practical." (Lui, F,B,27)

The student-teacher relationship was another aspect which was considered different for New Arrival students. Ranjine noted students from different cultural backgrounds differed in their respect for teachers and had sympathy for the teacher who was not granted respect.

"We have a very big respect for the teacher. In a way it's good [a casual and free environment] because it makes you very free but sometimes it's bad because the teachers can't say anything." (Ranjine, F,C,24)

Zhou (F,A,41) was an electrical engineer, who taught adults in a mechanical workers college in China. She noted that "nobody can talk when the lecturer teach them things" and considered the New Zealand environment better because "it's more interactive here; there's a better relationship with the teacher." (Zhou, F,A,41)

The noisier classrooms contrasted with students' home countries.

"Normally we don't talk; even if we don't listen to the lecturer we just keep quiet." (Ranjine, F,C,24)

"Very quiet classrooms [in China] but I like the environment here because lots of students can speak their ideas but in China students are not allowed to speak; it's

better here for learning; I like the free environment." (Lui, F,B,27)

The nature and intent of assignments differed between countries:

"Assignments here are bigger and more creative but in China the homework is just like a fixed job; no creativity." (Zhou (F,A,41)

"Everybody is expected to have the same answer [in Japan]." (Subako, F,A,37)

The different teaching approaches and lack of tutorials in their home country were noted by students from China and Japan.

"In China I think the lecturer teaches more; students spend much more time at school; homework is definitely HOME [student emphasis] work and not in the class. All the classes are lectures, no tutorials." (Zhou, F,A,41)

"Yes, very similar in Japan." (Subako, F,A,37).

Milo, from Bulgaria, noted the freedom of the New Zealand learning environment and compared this with the "very structured, not such a good approach" situation in his home country

"Teacher asks you to memorise; here quite different; quite free. Depends on your choice. Depends on you. Advantage is for people who really want to learn something but people who don't want to learn they are distracting." (Milo, M,A,41)

The high-specification computing laboratories and study resources were favourably noted

"I like the study environment here much better than in China. There's better resources here; computers, library." (Lui, F,B,27)

I think we're very very lucky here. Everything is different; the seating, the lighting, the way the teachers are really friendly and approachable. In Egypt there are 20,000 students doing the class. Teacher ratio, resources and the way they teach here is very very good ... I think the interactive part of teaching." (Khalid, M,B,34)

"New Zealand has many resources compared to my country [Sri Lanka]; so many books." (Min, M,B,42)

5 Discussion

The New Arrival student interviews revealed there was general satisfaction with many aspects of the learning environment. Students commented favourably on lecturers who ensured equal treatment of students with respect to the time given to individuals, responsiveness to questions and a clear explication of concepts and work to be covered within a set time frame. A personalised environment is important to New Arrival students, especially, because it helps ease their adjustment to a new culture of teaching and learning as well as coping with the English language. Two young Chinese male students, however, did not find their teacher "friendly" or helpful, feeling alienated to the extent that they "give up". They had a negative sense of self-efficacy which likely contributed to their fail result at the end of the year. For all students' self-efficacy, or belief in one's ability and judgments of one's own capabilities to organise and execute courses of action, is critical for academic success.

Positive self-efficacy has been shown to be a desirable trait of computing programming students and low self-efficacy is malleable in the first year of a computing course (Ramalingam and Wiedenbeck 1998). Students succeeding in their first computing courses are likely to have high self-efficacy, being more confident and more inclined to continue with their programming studies (Bernstein, 1994; Sproull, Zubrow, and Kiesler 1986). Perhaps these two New Arrival students would have had a happier outcome of their year's study had their self-efficacy been more positive, fostered by a diversity of approaches to teaching programming and an acceptance of "the validity of multiple ways of knowing and thinking, an epistemological pluralism" (Turkle and Papert 1990, p. 129).

Student maturity and experience appear to be positive mitigating factors in the computing learning environment. The average age of the New Arrival students was 32, some of whom had studied away from their country prior to coming to New Zealand. Some of the female students cited maturity and experience as reasons for feeling comfortable with their minority status and these attributes could also account for students reporting that they were not affected by the few racist incidents. Studies of the tertiary computing classroom have identified the minority status of females (Byrne 1993, Zuga 1999), together with the alienating culture of the computing environment for many women (Bernstein 1991, 1999, Brown 1994, Margolis and Fisher 2002, Ryba and Selby 1995) as factors contributing to female students' dissatisfaction with their learning environment and their choosing not to continue their studies in this discipline. The New Arrival women (and men) were a minority subgroup within the computing culture yet reported this did not impact adversely on them. The personalised and friendly computing learning environment possibly contributed to this finding.

Another factor that could have contributed to the largely positive student perceptions is the context within which programming is taught. Context has been posited as influential in the computing culture and the student learning experience. The students of this study were enrolled in polytechnics where there is a strong vocational focus and the computing programmes were situated within a business environment. This contrasts with American studies which have found a strong computing culture (such as that found in computer science situated within an engineering context) impacting negatively on female minorities (Camp 1997, Margolis and Fisher 2002, Sproull, et al. 1986). Researchers of a New Zealand study (McLennan, et al. 1999) suggest that a reason for the relatively large number of female students enrolled for their course is because programming is taught in a small university within a business environment culture and not under a "computer science" umbrella.

Poor English language proficiency and cultural adjustment problems were identified as inhibiting the learning for some New Arrival students, especially in the early months of their time in New Zealand. These areas have been confirmed as issues of concern from other studies (Beaver and Tuck 1998, Burns 1991, Mullins,

Quintrell, and Hancock 1995). Burns (1991) made recommendations that would mitigate some of the problems New Arrival students face on arriving in a new country of study. They include pastoral care provision through requiring new arrivals to attend a longer familiarisation period than is usual, using older, experienced students of the same ethnic group in a buddy/mentor scheme to assist new students settle in and the identification of at least one member of staff in each department who is known as the contact person for New Arrival students in the provision of support, advice, and monitoring progress. English language courses that focus on computing terms as well as colloquial English usage would negate some of the negative initial experiences on which some New Arrival students have commented and facilitate a "gradual infusion into the culture and local community" (Burns, 1991, p. 75) before classes start, thus preparing the New Arrival students for their study. A positive aspect for some New Arrival students who found language a problem was the independent approach they adopted in their learning. They placed a high reliance on study and learning sources apart from their lecturer. These included texts, the Internet, study group with friends and "thinking by myself".

The cooperative and collaborative way of working was another area of concern revealed through the interviews. A collaborative learning environment is widely believed to enable students to co-construct more powerful understandings than they could alone but this view oversimplifies important issues concerning the social structure of groups, the goals of individuals in groups and the diverse nature of knowledge construction. Too great a dependency on group assignments and tasks may create an inequitable environment for the capable students. For Khalid, this proved irksome and he resented the reliance of fellow students (and his teacher) on his helpful assistance. This approach is not always satisfactory or appropriate for all students and, as well, "may not be the best mode of learning for all educational aims" (Linn and Burbules 1993).

Course content and management relating to selection of student texts, and choice of exercises and assignments received criticism. The 'monkey see, monkey do' approach using step-by-step texts and handbooks was not appreciated by two students. They expected their laboratory work to facilitate their understanding and thinking for the long-term. They were not interested in surface learning (associated in Western schools with the use of rote learning strategies) but indicated a desire for deep learning where understanding is enhanced and knowledge able to be applied (Ng 1998). The value of practical assignments based on the "real world" was recognised by students and if adopted in classes would likely contribute to greater student satisfaction and understanding.

Criticism of the enrolment policy of one institution, voiced by one student, should be of concern to both lecturers and administrators if New Zealand is to build a reputation of learning excellence for New Arrival students. At risk students need to be identified prior to commencing their computing study and required to

complete bridging mathematics and study courses. On-going learning support throughout their first-year of study could help address the high failure and drop-out rates of students in programming.

6 Conclusion

The largely positive findings of this study are encouraging. The students were satisfied with the personalised, friendly, helpful and generally equitable environment and the well-resourced laboratories and classrooms. For many of these students their maturity and experience helped mitigate the culture of the computing learning environment. However for some of the younger, male students their “border crossings” (Cobern and Aikenhead 1998) were unpleasant and impacted negatively on their learning. The provision of a learning environment that suits the different student subgroups is no easy task but if New Zealand is to continue with a successful “export education” industry and meet ethical and contractual obligations to provide a quality computing learning experience for the New Arrival students, educators and administrators need to be mindful of this subgroup’s needs.

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