

Improved culturally-mixed group-project to promote intercultural skills and engagement

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***Abstract:** A group project involving randomly mixed local and international students was developed and trialled in a mechanical engineering unit in 2008 as a means to increase students' intercultural skills and engagement. The students were required to carry out a research group project designed to encourage the contribution and cooperation of all members of the group. Surveys and a focus group discussion prior to and after the project were carried out to learn whether the students had a heightened awareness and curiosity about other cultures and whether the experience had encouraged them to confidently engage cross-culturally. The students were also asked to comment on the difficulties they encountered during the group project. A modified project was carried out in 2009 incorporating some of the feedback obtained in 2008. This paper examines the students' responses to the project over both years, share the modifications made in 2009, and discuss what elements seemed to have a positive effect on the students' experience.*

Introduction

Internationalisation of the curriculum has been one of the emphases in most Higher Education institutions in Australia including Swinburne University of Technology. One of the driving forces for internationalisation for an Engineering program is the fact that Engineers Australia (EA) expects that the engineering graduates are *able to function effectively as an individual and in multi-disciplinary and multi-cultural teams* (Bradley, 2006).

Internationalisation of the structures and processes of education is characterised by a coming together of people with differing cultural orientations, thinking patterns, perceptions and emotions (Otten, 2000). This has been one of the main challenges of Australian universities over the past two decades, where there have been increasing numbers of international students, in all their cultural and linguistic diversity. This diversity needs to be recognised as a valuable resource for internationalising the curriculum. Unfortunately, students do not automatically engage inter-culturally and may miss out on critical learning opportunities, unless institutions artificially create conducive conditions as part of the formal curricula (Volet & Ang 1998). It has been suggested that improved interactions between local and international students are dependent on the way both the formal (sequenced curricula events aligned with assessments) and the informal curricula (optional learning activities not part of the formal requirements) are used to encourage and reward intercultural engagement (Leask, 2009).

It was with the above considerations, the authors developed a group project within a unit in Mechanical Engineering. This group project was developed to artificially create conditions for a deeper intercultural experience in order to develop students' cultural awareness and skills in a safe and meaningful environment. The group project was an assessable component designed to enhance and broaden intercultural perspectives by "forcing" students to work in culturally-mixed groups on a real-world problem. Culture in this project refers to "subjective culture" defined by Bennett (1998) as "learned and shared patterns of beliefs, behaviours, values of groups of interacting people" as opposed

to “objective culture” which relates more to the study of cultural systems found in specific areas of cultural studies.

The aim of the project was to provide students with an experience of working with those from different cultural backgrounds to raise awareness of their own cultural perspectives and those of others, and to provide an experience to build intercultural communication skills. The project was first initiated in 2008 (Phase 1). A modified project was carried out in 2009 (Phase 2) incorporating some of the feedback obtained in the previous year. This paper examines the students’ responses to the project over both years, share the modifications made in 2009, and discuss what elements seemed to have a positive effect on the students’ experience.

Methodology

Details of Group Project

A group project with 7-week duration was included in a third-year undergraduate Heat Transfer unit in a Mechanical Engineering program. The groups (25 groups in the unit), each of 4 or 5 students, were required to study, research and compare sustainable energy sources to deliver energy for domestic purposes in a remote location in Australia and overseas. The lecturer and the students were involved in the formation of the groups (please see details in Table 1). Each group had at least one international expert (which was expected to be the international student(s) in the group). International students are defined as those who are non-resident full-fee paying or exchange students.

The lecturer provided the groups a list of possible overseas locations to be chosen. The list was based on the place of origin of the international students enrolled in the unit; typically China, India, Indonesia, Nepal, Sri Lanka, Macau, Hong Kong, USA, South Korea, Dubai, Thailand, Germany and Malaysia. The choice of the overseas location was ultimately up to the groups, however it was expected that they would choose the location of the international experts (or international students) within the group.

The group needed to discuss the differences in the applications/practices of the chosen energy in Australia and in the other location based on one of the followings: (a) Energy source requirement and availability, (b) Cultural and social aspects, (c) Geographical aspects; e.g. middle of desert, on top of a mountain, etc., (d) Economic values; e.g. can the system build locally, (e) Economic feasibility, can local people afford to pay for this energy, etc., (f) Transport availabilities, (g) Government policies, (h) Manufacturing facilities, (i) Communication processes, (j) Timing aspects.

Linking the overseas location with the international experts (or international students) in the group encouraged two-way dialogue between students within the group. To give an example, one group (in the Phase 2) evaluated the use of geothermal energy for Cooper Basin in South Australia and Wataruwa (Rathnapura District) in Sri Lanka. In this particular group, the international expert (a student from Sri Lanka) provided the required “local” cultural and socio-economic (in addition to technical) information of Wataruwa, e.g. how receptive the people would be with the proposed new geothermal system considering the availability micro-hydro system with cheaper price.

Data Collection

To gain an insight into students’ perspectives as a result of the group project, a survey was carried out to identify how effective the group work project assisted in building self-awareness and intercultural communication skills. They were asked to report on how valued they felt by the group, how confident they were working with people from different backgrounds and also whether they felt they needed to learn more about inter-cultural communication. Other questions in the survey related to how well the project had encouraged students to move towards accepting difference (as opposed to denying or minimizing it) adapting to difference (greater empathy) and even demonstrating welcoming difference and engaging more deeply on a personal level. This survey was grounded in the work of Bennett “Development Model of Intercultural Sensitivity” first introduced in 1986 and cited in Bennett (1998). It was assumed that local and international students would range from ethno-centric through to the

ethno-relative stages depending on prior experiences which for some have led them to being more open to engage cross-culturally.

At the end of each semester, a focus group was run with a small but representative group of students (consisted of local and international, male and female students of a total of 6). In each case, the non-teaching academic conducted the focus group. The purpose of the focus group was to clarify what being “valued” actually meant to students during the group work project and to identify if the project provided students with a meaningful opportunity to develop greater intercultural awareness and skills.

From the survey and focus group results of the Phase 1 of the project in 2008, a number of possible improvements had been identified which were implemented in the Phase 2 in 2009. The details on the differences between the group project carried out in 2008 and 2009 are shown in Table 1.

Table 1: Comparison of the group project carried out in 2008 and 2009 in the Hawthorn campus

Year 2008 (Phase 1)	Year 2009 (Phase 2)
NUMBER OF STUDENTS IN THE UNIT	
<ul style="list-style-type: none"> 112 students (25 international, 87 local) 	<ul style="list-style-type: none"> 130 students (26 international, 104 local)
GROUP FORMATION	
<ul style="list-style-type: none"> The lecturer was involved in the formation of the groups. The students were allowed to choose 1 or 2 friends that they wanted to work with to form a sub-group. The lecturer merged two sub-groups to form the final groups. This was to ensure that each group had members with diverse backgrounds. 	<ul style="list-style-type: none"> The lecturer was involved in the formation of the groups. The students were allowed to choose 1 or 2 friends that they wanted to work with to form a sub-group. The lecturer randomly merged the sub-groups.
ASSESSMENTS	
<ul style="list-style-type: none"> The groups reported their finding in a 10-page group report and in a 10-minutes group oral presentation (10% and 5% of final mark) 	<ul style="list-style-type: none"> The groups reported their finding in a 5-page group report and in a 10-minutes group oral presentation (10% and 5% of final mark)
STUDENTS PREPARATION AND SUPPORTS	
<ul style="list-style-type: none"> A lecture on “bridging the cultural gap” was given by an external consultant in lecture time and was recorded using Lectopia Group Project Instruction and Outline were given in Blackboard The Project contained open-ended problems 	<ul style="list-style-type: none"> A Lectopia recording from 2008 was made available in the Blackboard. Students were encouraged to watch it in their own time. More concise and focused Group Project Instruction and Outline were given in Blackboard Inclusion of explicit task on heat transfer calculation
Relevant supporting documents provided in Blackboard: <ul style="list-style-type: none"> Materials/resources on Team Development and Getting Team Unstuck Oral Presentation Guideline Report Marking Scheme Oral Presentation Rubric Peer Assessment Number Form / Contribution Distribution Form Team Meeting Log Form Schedule and Milestones Form 	The same supporting documents were provided. In 2009. Additionally, in this Phase, the students were reminded several times to utilise these resources to help them with the working group.
MENTOR AND LECTURER SUPPORTS	
<ul style="list-style-type: none"> Mentors: 1 lecturer + 2 tutors Students were invited to consult with mentors should there be problems 	<ul style="list-style-type: none"> Mentors: 1 lecturer + 2 tutors + 1 additional tutor dedicated for group project More supports (consultations) for students/groups Mentors were better prepared
PEER ASSESSMENTS	
<ul style="list-style-type: none"> The groups were marked and given a group mark by the lecturer, however an individual mark for each group member was given by adjusting the group mark considering the “peer assessment number” (PAN). The group was responsible to determine the percentage contribution distribution (of total 100%) of the group members. This distribution had to be a consensus decision of all the members of the group and substantiated by the team meeting logs and milestones. 	

<ul style="list-style-type: none"> The PAN (varies between 0.8 and 1.2) was calculated as $PAN = \%contribution / average \%contribution$. For a group with four members (e.g. student A, B, C, D) with contributions of 25%, 20%, 30% and 25%, the PAN would be 1, 0.8, 1.2 and 1, respectively. Therefore, when the group received a mark of 10 (out of 15), the individual mark of the students would be 10, 8, 12, and 10, respectively. Students (peer assessment), tutors and lecturer marked the groups presentations
METHODS OF FEEDBACK COLLECTION
<ul style="list-style-type: none"> Survey after Group Project Focus Group discussion Student Feedback on Teaching and Student Feedback on Subject

Results and Discussion

Table 2 summarises the survey results on the students' experience in the project in 2008 and 2009. It can be seen from the table that the students (both local and international) responded more positively in the Phase 2. It is pleasing particularly to see that 92.3% of the local students felt their knowledge was valued in the group. The majority of the local students also realised that they needed to learn more about inter-cultural communication. All the international student respondents felt they benefited from the project, as they felt more confident working and studying with people from different backgrounds after the completing the project.

Table 2: Students' responses on their experience in the project

	Local students*		International students*	
	Agree		Agree	
	2008	2009	2008	2009
My knowledge/experience was valued by the group	68% (21% unsure)	92.3% (7.7% unsure)	64% (36% unsure)	66.7% (33.3% unsure)
I am more confident working / studying with people from different backgrounds	36% (21% unsure)	61.5% (23.1% unsure)	36% (27% unsure)	100%
I need to learn more about inter-cultural communication	59% (19% unsure)	73.1% (19.2% unsure)	55% (9% unsure)	66.7% (33.3% unsure)

*Number of respondents: 2008 (29 Local, 11 International), 2009 (26 Local, 6 International)

The students' responses on whether the project had encouraged them to engage with other cultures are summarised in Table 3. The results again show that in the latest Phase, the students responded more positively in almost all the aspects questioned. It also appeared that the project had more effect on the international students. High percentage of the international students felt that the project had encouraged them to engage more deeply (including studying and working) with people (students) from different backgrounds.

Table 3: Students' responses on whether the project encouraged them to engage with other cultures

	Local students*		International students*	
	Agree		Agree	
	2008	2009	2008	2009
The project raised my curiosity and interest in other environments and/or cultures	23% (23% unsure)	42.3% (34.6% unsure)	55% (18% unsure)	40% (40% unsure)
The project encouraged me to broaden my cultural and international perspectives	11% (31% unsure)	34.6% (23.1% unsure)	36% (18% unsure)	60% (40% unsure)
The project encouraged me to	36%	26.9%	45%	83.3%

work/study with people from different backgrounds	(12% unsure)	(38.5% unsure)	(9% unsure)	(16.7% unsure)
The project encouraged me to consider how I communicate with people from different backgrounds	46% (12% unsure)	30.8% (46.2% unsure)	46% (27% unsure)	100% (0% unsure)
The project encouraged me to engage more deeply with people from different backgrounds	23% (23% unsure)	26.9% (38.5% unsure)	36% (27% unsure)	80% (20% unsure)

*Number of respondents: 2008 (29 Local, 11 International), 2009 (26 Local, 6 International)

The increase in the percentage of students with positive experience in the project in almost all aspects is very encouraging. The authors realised that different cohorts will have different characteristics and that they may not be directly compared. Nevertheless, the significant positive increase (>200%) in many of the aspects under investigation indicates that the changes made in the Phase 2 had been very successful.

There are many advantages in using group work to increase student learning including inter-cultural skills. Olivera & Straus (2004) suggested that group work *'fosters transfer learning to individuals'*, in particular due to the *'cognitive elements of group interaction'*. The group project provided a way for students to develop a new awareness of their own and other's cultural backgrounds. They were also required to consider how they communicated and worked together to achieve a common goal. The results of the surveys do indicate that there has been an overall increase in cultural awareness and some development towards greater understanding and adaptability that may otherwise have not occurred with traditional group work.

However, the implementation of the group work activities can be tricky, in particular when a large class is involved; and when cultural gaps exist and provide additional complexities. It has been pointed out in the previous work by the authors (Rhamdhani *et al.*, 2009a) that the major issues encountered by the students were not just related to working in culturally and linguistically diverse groups, but due to general issues of working in groups. Students pointed out these issues through comments *"could have been more effective if group members attended the scheduled meetings (65-9)"*, *"...even the group leader does not have any authority to do anything, so if you have dysfunctional group member there is nothing you can do about it..(03-9)."* The changes made in the second round (as described in Table 1), in essence were addressing problems associated with practical issues of working in groups, e.g. additional mentor and additional supports to reduce group dysfunctionality.

From the current study, we observed that by giving appropriate supports, the students appeared to be more comfortable in carrying out the project. They can, thus, enjoy the work and get the most benefit out of it. The role of mentors in this case is important. As pointed out by Jaques (1992), mentors have multiple roles as in this group project. They should have the technical (knowledgeable in the area of heat transfer and thermodynamics) as well as the inter-cultural skills so that problems regarding the group work can be identified early to provide an optimum solution. More mentors in the Phase 2 also provided additional technical assistance and group management support to the students.

It has been pointed out (Bolton, 1999) that students can be frustrated if lecturers/mentors do not provide adequate guidance throughout the duration of a group work project. The "open-ended" nature of the actual project problem introduced in 2008 appeared to be not suitable. A student commented *"...I thought the guidelines or the whole topic, should be more realistic..."* followed by *"...if you are designing it in actual like heat exchanger or something like that then it is more technically related to the subject rather than research on the internet"*. In the Phase 2 in 2009, the instructions and outline of the Group Project was more concise and focussed. More mentors in the second iteration also meant that the students received more guidance throughout the duration of the project on the technical matters. It has been suggested by Volet & Ang (1998) that when students are required to work inter-culturally, especially when they have had limited prior experiences working in mixed-groups, the project needed to have highly structured tasks with set roles. Once they have developed skills and

experience of working in culturally mixed groups, then, more open, creative and ill-defined tasks may be given.

Group assessment, if not properly done, can also lead to student frustration and resentment, as evidenced by previous investigators (Livingstone & Lynch, 2000; Pfaff & Huddleston, 2003). In both iterations, peer assessment was incorporated into the group project to reduce “free-riders”. The groups were marked on their work (project report) and given a group mark by the lecturer, however an individual mark for each group member was given by adjusting the group mark considering the “peer assessment number” (PAN). The PAN (varies between 0.8 and 1.2) was calculated based on these contribution of the team members substantiated by the team meeting logs and milestones (see details in Table 1). The additional mentor in the Phase 2 provided closer supervision of the groups and allowed the peer assessment to work properly (avoided irregularities on PAN). The lecturer, tutors and students themselves took part in the assessment of the group presentations.

It also appeared that by sharing the rationale directly with the students on the purpose and value of the mixed group project as a learning exercise, the students were more receptive. They were more aware that the cultural aspect of the project provided them with an opportunity to develop their inter-cultural skills as part of a wider “internationalisation of the curriculum” at the University. As has been suggested by Zimitat (2008) there are significant differences in perceptions, orientations (as well as experiences) of the concept of internationalisation between students of different cohorts, between different academic groups, and between domestic and international students.

Concluding Remarks

A group project has been used to promote and enhance intercultural self-awareness and engagement between students from diverse backgrounds. The project was first introduced in 2008. A revised project was carried out in the following year taking into account the feedback from the students. The interventions made in the Phase 2 appeared to be successful. In essence, the major problems that the groups encountered during the project were associated with working in groups, in addition to cultural gap problems. The additional supports for the students and more concise and focused instructions on the group project given in the Phase 2 appeared to have had positive impacts. In summary, we felt that preparation was the key for the students to get the maximum benefit of the activities. The lecturer, the tutor and the students themselves; the tools; the assessment mechanisms; and the appropriate supports need to be well prepared. If we are truly putting significant efforts then the students can gain the benefit. For further improvement, a more formal and appropriate reward can be incorporated in the group project for their intercultural engagement.

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