

Global engineering 101: a first year international ambassadorship program

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CONTEXT

Facilitating students' capacity to engage with the world beyond the classroom is a challenge of which engineering educators have been aware for many years. In Australia, technical and professional aspects of this engagement are frequently described in the graduate attributes¹ of engineering schools. The pursuit to create world-class engineers has resulted in the now accepted methods of formally integrating classroom learning with authentic industrial ties, work experience and internships. Mechanisms such as course and program accreditation ensure that educators consciously plan for broader world engagement within the curriculum. Through the implementation of documents of expectations, such as the Engineers Australia Stage-1 Competency Standard for Professional Engineers and the Code of Ethics, standards are provided through which individuals can gain recognition in becoming world-class engineers.

The recent internationalisation of the engineering industry has made it evident that the learning outcomes from Australian Universities must prepare students to be globally mobile. While the influx of international undergraduates to Australian universities exposes our students to aspects of multiculturalism, this remains in a domestic setting that merely results in a cosmopolitan on-campus society within the comfort of an Australian environment. Therefore the establishment of overseas mobility opportunities aims to create broader in-depth practical experiences that are authentically immersed within a foreign location. The School of Mechanical Engineering at the University of Adelaide (UofA), together with the Harbin Institute of Technology (HIT), therefore piloted an international student ambassador program, in which first year undergraduate students from the UofA visited HIT to work collaboratively with the Chinese students. This overseas trip has already demonstrated the possibilities of further student engagement across both universities.

PURPOSE

The purpose of this research was to examine preliminary findings in relation to an intensive exchange program between the two participating universities. Co-authored by students who were directly involved in this pilot, the paper discusses their perceptions, along with those of their peers, regarding the critical examination of the advantages and constraints of future possible faculty-driven exchanges.

APPROACH

A group of students from the University of Adelaide travelled to the Harbin Institute of Technology in China to engage in a mutual learning experience alongside a class of Chinese students. The Australian students were situated in Harbin for a two-week period, working collaboratively with the Chinese students on a Computer Aided Design (CAD) project and a robotic challenge. These experiences were articulated through a measurable study that recorded both qualitative and quantitative data.

RESULTS

Preliminary results indicate this ambassador pilot program was successful. Survey responses indicated that participating students from the UofA are now more motivated towards having an international experience in their future vocations. It was also evident that social networks between the Chinese and UofA students have been established. Furthermore, many of the UofA students hope to develop their second language skills, although they do feel that there are limited opportunities to do so in their undergraduate curricula.

CONCLUSIONS

The value of this pilot exercise demonstrates that Australian engineering education is likely to directly benefit through the introduction of global mobility programs into their curricula. The experience of the UofA students undertaking the HIT ambassador program indicates the critical importance of authentically immersing students within a foreign culture, as part of a cohesive systemic process that enables learners to engage and develop into professional engineers.

KEYWORDS

international exchange, student experience, mobility

Introduction

The world has become increasingly interdependent and globally connected. As a result it is vital that university students are exposed to different cultures and experiences in order to improve their global awareness (Messer, 2006). This is especially important for engineering students, with many engineering educators in recent years emphasizing the importance of developing globally prepared engineers who will be competitive in a modern professional environment. The skills necessary are varied including technical competencies but also global sophistication, cultural awareness, flexibility and mobility (In search of Global Engineering Excellence, 2006).

While the importance of global competency is widely acknowledged, relatively low participation in international exchange remains a problem in Australia, with less than 1% of Australian undergraduates completing part of their studies overseas (Daly & Barker, 2005). From this small group, less than 3% are studying or engineering or IT courses (Daly & Barker, 2005). Student ambassadorship programs may offer a solution to this problem. By offering faculty based scholarships to students, universities can encourage students to branch out and improve their global awareness at the same time as improving relations with overseas institutions.

Purpose

The purpose of this paper is to evaluate the success of a pilot exchange program between the University of Adelaide (UofA) and the Harbin Institute of Technology (HIT) in order to determine the position of the faculty with regards to global awareness for Engineering students. The evaluation focuses on the following key areas:

- the extent to which students were encouraged to become actively involved in further long-term study exchange abroad as a result of this pilot;
- The development of networks between HIT and UofA students; and, the increase in cultural awareness of the participating students.

The need for global exchanges is apparent with the recent introduction of the New Colombo Plan (NCP). The NCP was set out by the Australian Federal Government as an initiative to develop people-to-people and institutional networks with the Indo-Pacific region through granting scholarships to Australian undergraduates to study and undertake internships in the region (DFAT, 2014). However, the realisation of a need for more global exchanges is certainly not new. In 1996, a Global Exchange Program similar to that present in many universities today was being pioneered at Rensselaer Polytechnic Institute, USA (Gerhardt, 1999) along with faculty involvement in overseas exchanges (Gerhardt, 2001). Some institutions have already noticed this trend and begun positioning themselves to take advantage of faculty based global exchange. Spelman College in Atlanta, USA have initiated four degree programs specifically designed to send students overseas (Davis, 2014). They have brought the faculty into this structure by sending eight faculty members overseas with the students to act as codirectors of the exchange.

This paper aims to critically examine the results of the UofA – HIT ambassadorship to provide context and constraints on the role of faculties in facilitating and encouraging overseas exchange.

Method

Degree programs within the *Faculty of Engineering, Mathematics and Computer Science* (ECMS) at the University of Adelaide have continually evolved in order to connect with the evergrowing technical industries which demand global competitiveness. In an attempt to accomplish this, a pilot exchange program was initiated with a foreign university (HIT) with the

aim of increasing participation in future exchange programs, in addition to developing the adaptability of the current engineering students.

In the non-teaching period early in 2014, 10 students from the UofA were sent on an ambassadorship program to HIT, China where they worked alongside their Chinese peers on 3D Computer Aided Design (CAD) projects. The Australian students, who already had exposure in CAD modelling, assisted the Chinese students' learning, the Chinese students who had very little exposure to 3D CAD environments in their curriculum. UofA and HIT students also participated in a robotic challenge in which teams of Australian and Chinese students competed to design and build small robots to navigate a course.

During this exchange program, the Australian students were living within close vicinity of HIT whilst their Chinese peers were living on campus. The program involved the students meeting at 9am each morning to begin their CAD class. This class would finish at 12pm followed by an hour lunch break and then 4 hours of either Chinese culture and language class, or the robotic challenge. UofA students would socialize with their HIT counterparts during the lunch break and after study for the day. The social activities included meals and trips to large cultural events in the vicinity of HIT.

The language barrier associated with an international exchange program such as this was nullified, mostly by the Chinese students' strong English skills. After a number of days within close proximity to one another, students began to better understand how their peers would communicate with them.

Students were sponsored through the Australian Government AsiaBound Scholarships and incidental costs were covered by the students.

Following this exchange experience, a survey was administered to the UofA students in order to evaluate student perceptions of the program. Both quantitative results in the form of yes or no responses, as well as qualitative results through longer answer responses were recorded.

Results

To analyse the views of the students involved, each student completed a survey with an array of questions detailing different aspects of the exchange program. Key questions allowed a comparison to be made, as the data displays the students' views and attitudes before the exchange as well as after. Table 1 shows the questions given in the survey and below are described the answers which each student gave anonymously.

Table 1: Survey questions and broad agreement (survey size = 10)

	Question	Broad agreement
1	Do you think the experience was successful in allowing yourself and your classmates to learn and collaborate with students from the other university?	100
2	From this experience, did you develop a strong network (i.e. friendships, new professional relationships) with students from the other university?	30
3	Would you recommend that other students increase their global awareness now that you have been part of an exchange program?	100
4	Have you already planned or organized any future studies overseas?	40
5	From this experience, would you consider going on your own exchange?	100

6	As a result of this exchange, are you participating in any extracurricular subjects to allow for further international travels (i.e. learning a language?)	40
7	Has your cultural awareness increased over the course of the trip?	100
10	Has this experience caused you to consider taking an international postgraduate exchange?	90
11	Before this exchange, would have you considered studying long term overseas?	30
12	Has your opinion of overseas study changed after this exchange?	70

To supplement the ten quantitative questions, an additional four open-ended qualitative questions were included to provide a greater understanding of student attitudes towards the international exchange program.

8	Are there any improvements which could be made to the overseas exchange?
9	What was the most memorable part of the trip for you?
13	If your interest has changed, please state why. Or if your interest has not changed, please state why not.
14	Reflecting back on the pilot exchange program, and acting as a student ambassador for your respective university, how will you use the skills developed to further your studies in the future?

Discussion

One of the key conclusions drawn from this survey is that this pilot program was successful in increasing student interest in participating in longer-term exchanges. This is evident in the responses to questions 10, 11, 12 and 6, which indicate that only 30% of students were considering long term study abroad prior to their participation in this pilot program. However following this pilot, 100% of students indicated their interest in participating in their own overseas exchange program. Similarly, 90% of students responded that the experience had caused them to consider taking an international post-graduate exchange program. These results are also verified in long answer responses given by the students: three students suggested in response to question 8 that the length of the student ambassadorship was inadequate and they desired more time.

Responses to question 14 indicate that prior to the exchange students were apprehensive of studying abroad, however the pilot program was successful in changing student perceptions. Some of the responses include:

I was nervous about living overseas as I thought I wouldn't be able to cope. But this trip has shown me you meet lots of helpful people who can ease the transition between universities.

Going on the pilot exchange program gave me confidence that I could look after myself in a foreign country.

The diversity in what you learn and experience was excellent and it no longer seems as intimidating.

It is clear from the responses to question 14 that the major factor discouraging students from overseas travel was self-confidence overseas. After the study, the students have indicated

that they no longer feel as concerned about this, and are eager to take part in their own exchange program.

In response to question 2, many students indicated that they did not build a strong network with foreign students during this process. This may be tied to the suggestion that the students felt they needed more time overseas, which was prevalent within the responses to question 9 (Below).

The length of the exchange could be extended in order to provide a more meaningful experience.

The trip could last a week or two longer.

The students indicated in question 5 that they are now more eager to take part in their own overseas study which may indicate that the lack of overseas study in Australian educational institutions is due to a lack of involvement from the faculty. The faculty may be the key component to overseas travel becoming a rite of passage for Australian undergraduate students.

The results of question 10 indicate that students are interested in studying post-graduate courses overseas. This implies that the results of this ambassadorship were more farreaching than merely at undergraduate level, and could impact the number of students undertaking further study.

The survey responses to question 3 also displayed that students are eager to share their experiences and encourage other students to take part in their own exchange programs. This creates a chain effect wherein students reciprocate exchanges with lower years progressively. Some of the students involved in the 2014 UofA - HIT pilot exchange program have also indicated that they have offered their time to students who may be interested in studying at HIT, effectively acting as home grown ambassadors for the overseas institution.

Question 4 rendered results that indicate that just under one half of the students have actually followed through on their plans to study overseas and will soon be doing so.

Some of the negative feedback received from the survey include students not continuing their education in the foreign culture upon their return, and students not developing their networks further on return. This could be an effect of the short length of the study ambassadorship, or possibly something regarding the content within which it took place. Further research must be conducted in order to optimize the function of future exchanges. Some of the responses students gave in long answer questions seem to indicate the major issues are study length and societal integration:

I think doing a longer trip to allow for the completion of a full subject would have been better."

Perhaps one of the Chinese lecturers could have taught us something to allow us to learn what the Chinese education system is like."

The students indicate that the highlight of the trip was more interaction based than location based. They stated, for example:

Just interacting with the HIT students and forming connections with them was certainly memorable.

The results suggest that the students value the experience of interaction with their foreign peers more highly than any other aspect of the exchange. This is a very important argument in favour of faculty-based ambassadorships, as in this exchange program the faculty was

successful in pairing students with foreign peers in order to facilitate interaction between HIT and UofA students.

Conclusion

This paper has analysed the student ambassadorship program which UofA piloted in 2014. From identifying and analysing the structural factors of the student exchange, and each student's response to overseas travel, it is evident from question responses that the international study exchange has successfully increased the students desire to become globally active. The exchange displayed how students that are initially apprehensive toward overseas travel, can benefit from the short-term experience. Over the course of the two weeks, 7 out of the 10 students changed their perspective on studying abroad, looking to further their international study experience. They were also more likely to share their experiences, encouraging their peers to consider an exchange. The research concludes that student ambassadorships may be an effective way to increase the number of students travelling overseas as part of their university program. Further research is needed to show whether international faculty driven study exchanges will increase engineering student motivation and retention, providing the necessary skills to produce experienced, globally ready engineers.

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