Full Paper

INTRODUCTION

International students (IS) make up roughly 11% of first-year engineering students each year at University XXX. Students are required to take two compulsory project-based courses ABC123 – Engineering Design (E1) and ABC123 - Engineering Modelling and Problem Solving (E2). Both of these courses require IS to work in teams to design a working prototype, write reports and reflect on their work. Teamwork is assessed through peer assessment (PA) in which IS are known to score poorly (Chen & Kavanagh, 2013) and this affects their final grade. Thematic and semantic analysis of the feedback provided by peers shows that there are two main factors for this: a significant communication gap, and poor quality of work (Chen & Kavanagh, 2014).

The cultural barriers and educational differences that IS experience can be seen to underpin these difficulties, and it is clear that intervention is required to help transition IS into project-based courses. As engineering educators are not well versed in teaching English as a second language, a proposal for a contextualised English support program, EAC (English for Academic Communication), was made to on-campus experts, The Institute of Continuing & TESOL (Teaching English to Speakers of Other Languages) Education. The authors worked together to develop a program that could run alongside E1 and engage IS in activities that would develop the skills necessary for good teamwork and communication. In short, EAC aimed to:

1. improve communication between domestic and international students working in teams;
2. increase IS peer assessment results;
3. ensure IS were aware of team performance expectations;
4. strengthen the IS experience through provision of timely support; and
5. increase the linguistic proficiency of IS.

This paper presents a review of the support program that was implemented as a pilot in 2014, and at full-scale in 2015.

OVERVIEW OF LANGUAGE SUPPORT COURSES

Generic language support courses can be found in almost all universities with significant IS intake but they are generally focused on grammar and syntax and often don't meet the technical language requirements of engineering. This was highlighted by Wait and Gressel (2009) who found a lack of correlation between IELTS scores (English language entrance exam) and academic success. Many courses target post-graduate students or academics who aim to publish and present work to a specialised audience but few target the issues IS experience with first-year transition (Coleman, 2008; Lembaga Bahasa Internasional, 2015).

Watkins and Green (2003) implemented an engineering-specific support program for graduates. Using surveys, they established that students perceived English proficiency as a long-term objective and not something that they would obtain through a single course/ program. However the participants reported speaking very little English outside of class, as they were more interested in short-term gains. Their program was successful as measured by student survey and was based on a foundation of self-paced assessment, task orientation, and a strong focus on mentoring and meeting the needs of the students.

Contextualised language support programs have been successfully implemented across four schools at XXX (Coleman, 2008). In particular, the School of Pharmacy's program 'SCRIPT' that targets at-risk first year students, won an national award for enhancing learning in 2011 (UQ News, 2011). Participants reported enhanced student experience and confidence in their work across all aspects of English communication, as well as improved examination marks in oral, practical and written exams (McKauge et al., 2009).

EAC

Our pilot program was developed based on the framework of SCRIPT and took into account the work of Watkins and Green (2003). It was offered to students taking E2 in Semester 2, 2014 and was taught alongside the course on a weekly basis. Students enrolled in the program attended a two-hour session each week: from the week before semester started till Week 8 of the 13-week semester. The staff to student ratio was 1:20 based on the

experience of the TESOL staff as to the maximum number that could be effectively taught by one teacher. Attendance in the pilot was voluntary though highly recommended and widely advertised.

The program consisted of 9 modules with each covering several developmental areas identified as being key to IS success in project-based courses:

- teamwork (including peer assessment) and cultural support (in 6 modules),
- listening skills (in 5 modules),
- speaking skills (in 9 modules), and
- writing skills (in 3 modules).

The modules required IS to practice tasks similar to those they would encounter in the upcoming week and to be placed in scenarios they would encounter in E2.

The pilot program suffered from attendance issues but feedback from those IS that did complete the majority of the modules was sufficient to justify full implementation of EAC for E1. Therefore, to address low enrolment and patchy attendance, EAC was made compulsory for all first-year IS and the content was revised such that it integrated with E1 for Weeks 1 to

The move away from beginning in the week before semester was necessary as many IS do not arrive in the country until Week 1.

As some IS have high levels of English language proficiency, during the first module students were given the option to leave the program if they felt they would not benefit from attendance. Facilitators in each classroom were also asked to identify students who demonstrated a high level of English proficiency and these students were advised that they were not required to attend.

EAC Evaluation

Cohort Identification

There was insufficient data, due the sporadic attendance and low number of students enrolled in the 2014, to provide meaningful analysis. Therefore the data presented here is from 2015 when EAC supported E1.

In 2015, 104 IS were initially automatically enrolled in EAC with major representation from Vietnam, China, Malaysia and Ecuador (Figure 1). Countries with less than 5 students were omitted from the evaluation as the sample size was not significant; these were mostly smaller countries from the Asian region. However, this data was not aggregated as cultural and educational differences vary significantly (Chen & Kavanagh, 2013, 2014) and hence these

sets are distinct. Three students who withdrew part way through EAC were also omitted from the evaluation.
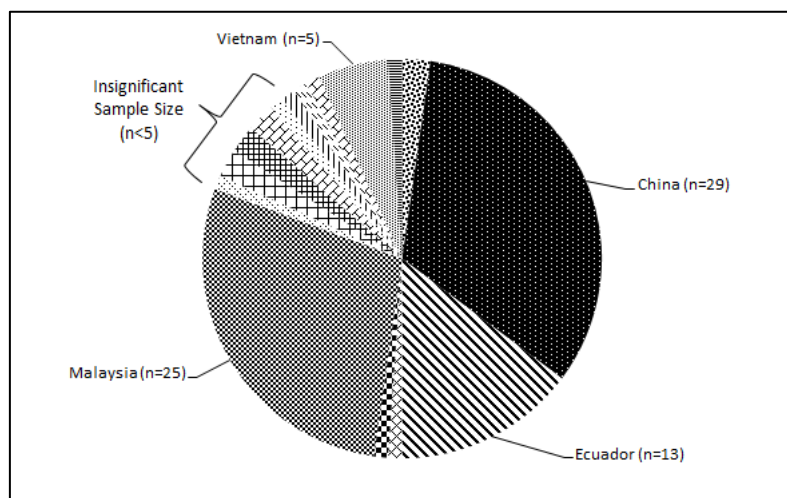

Figure 1: EAC 2015 IS country of origin

Data Collection

Table 1 summarises the data collected for the four main countries of origin.

Table 1: EAC evaluation data

Data	Description	Measurement
Attendance	The number of modules the student attended and also the type of modules attended (e.g. writing).	0 [Note 1] - 9 modules
High School	The country where the student completed high school or equivalent.	Country
Peer Assessment	The E1 peer assessment scores from Week 6 and Week 13. Peer assessment uses scores out of 100 across four categories (Communication and teamwork, Timeliness, Quality of work, and Input) from all team members including the IS.	Scores usually between 0.8 – 1.1 with 1.0 being the expected average
Individual Report	Students are required to compile an individual report detailing their project scope, prior art, project management, and preliminary design. This is a Week 4 submission designed to aid transition for all students by providing a benchmark for university assessment.	0 – 20%
Final Grade	Final course grade as determined by calculation of all assessable items and factoring in peer assessment scores.	Grade point average measured on a 7 point scale (7 = highest)

1. Zero attendance includes both IS who opted out of the program due to strong English skills, and those students who failed to attend despite being automatically enrolled.

An end of program survey was also conducted with a response rate of 18. The survey aimed to identify students' incoming English level competency, overall satisfaction with the course, and how useful they found specific parts of the program.

RESULTS AND DISCUSSION

Overall Attendance and Grade

Despite representing the majority of the class, Chinese students had the lowest attendance on average and also the lowest E1 grade (Table 2). It was also identified that IS who completed high-school in Australia had had very low attendance overall averaging 1.9 sessions. This is an important distinction in interpreting the data, as these students who are presumably accustomed to local culture, skewed attendance data.

Table 2: Attendance and final grades of EAC participants

Country of Origin	Average number of sessions attended	Average Final Grade
China	5.2	5.2
Ecuador	5.7	5.8
Malaysia	5.8	5.6
Vietnam	6.2	5.6

Attendance started at 84% with a noticeable drop to 58% in week 4 when the individual report was due. Numbers continued to wane, dropping to 41% after Week 6 and ending at 25% in the final week Figure 2.
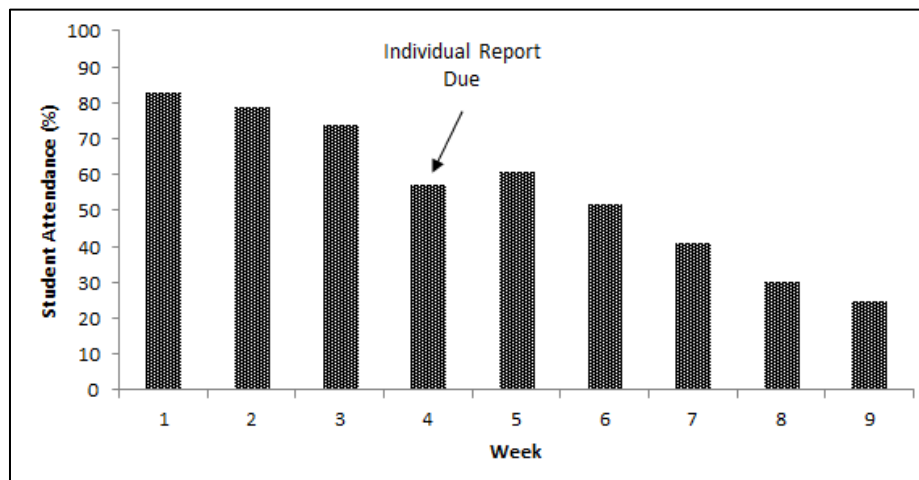

Figure 2: EAC attendance

Report Writing

A key success indicator in EAC (and E1) is a students' ability to demonstrate a high level of communication via a written report. The first three modules of EAC therefore contained material aimed at assisting students in completing their individual report assessment. E1 students must achieve a passing grade of 10/20 to pass the course; those who fail are allowed to resubmit for a capped mark of 10. All reports are returned with a high degree of annotation indicating where improvements are required and thus most students manage to pass with their second submission.

Figure 3 compares the individual report mark with the number of writing sessions that students attended. Those IS who needed to resubmit (i.e. who did not initially submit a passing report) are marked with an X; the original report mark of these students was not recorded. All four groups show a general positive correlation between report marks and session attendance indicating that written communication skills were developed across the sessions.
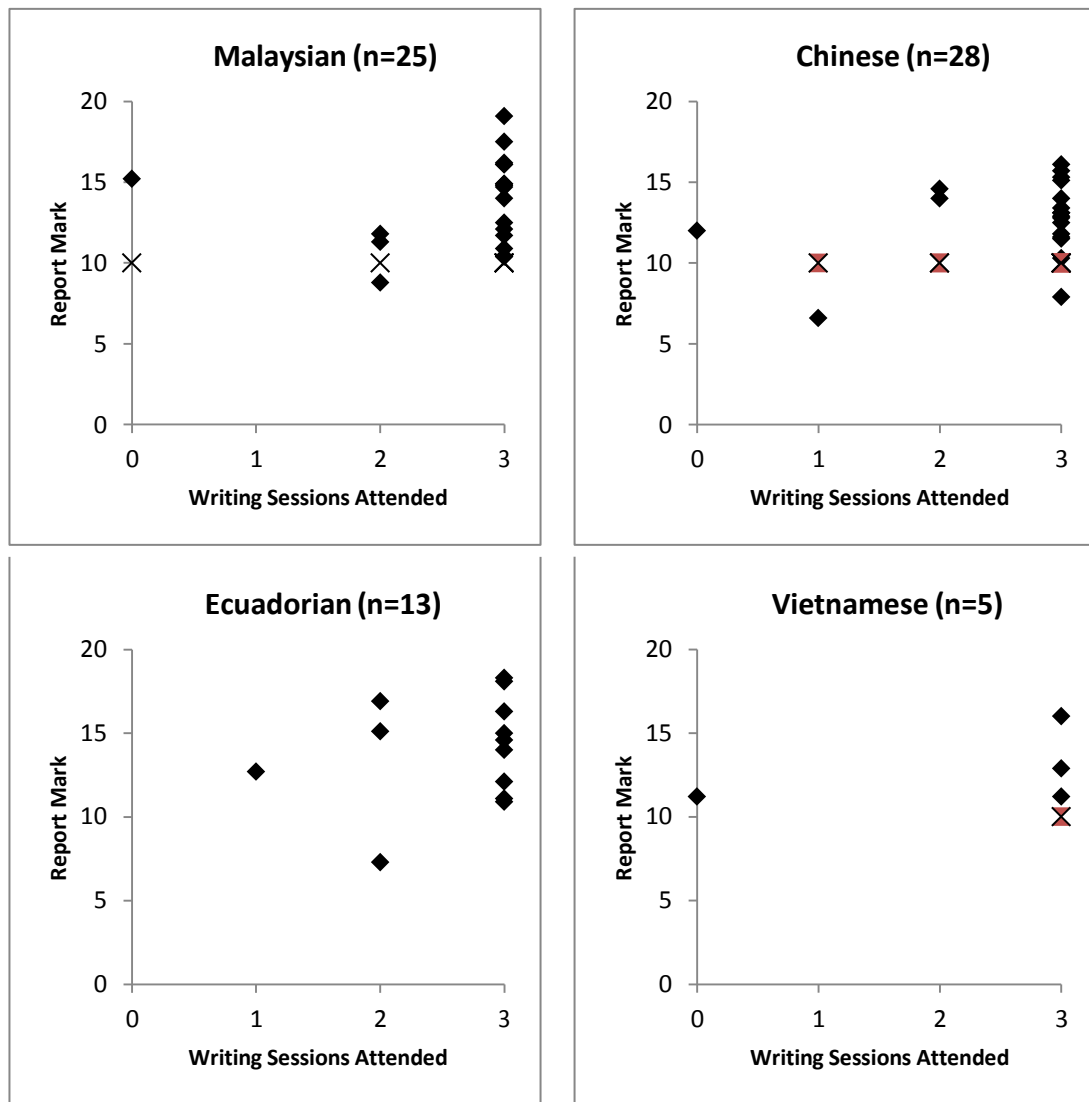
Figure 3: Individual report performance versus writing sessions attended

The greatest improvement through session attendance was seen in the Malaysian cohort which is an expected result as in a previous study it was identified that Malaysian IS are the most capable in adapting to the new learning environment (Chen & Kavanagh, 2013). The Chinese cohort shows the lowest overall grades in the report and least improvement. Combined with their low attendance and overall grades in Table 2, it is likely that EAC is not addressing the needs of the Chinese students and that they fail to see the value in attending.

Figure 4 shows the failure rate against the number of writing sessions attended. As previously mentioned, data for zero attendance includes IS who opted out of the program due to a high level of English language proficiency and therefore this data represents two distinct groups and this may explain the low failure rate. Examination of the other data shows a 50% failure rate for one session attendance, 47% for two and 22% failure for all three session attendance. This trend is significant and supports the success of the program.
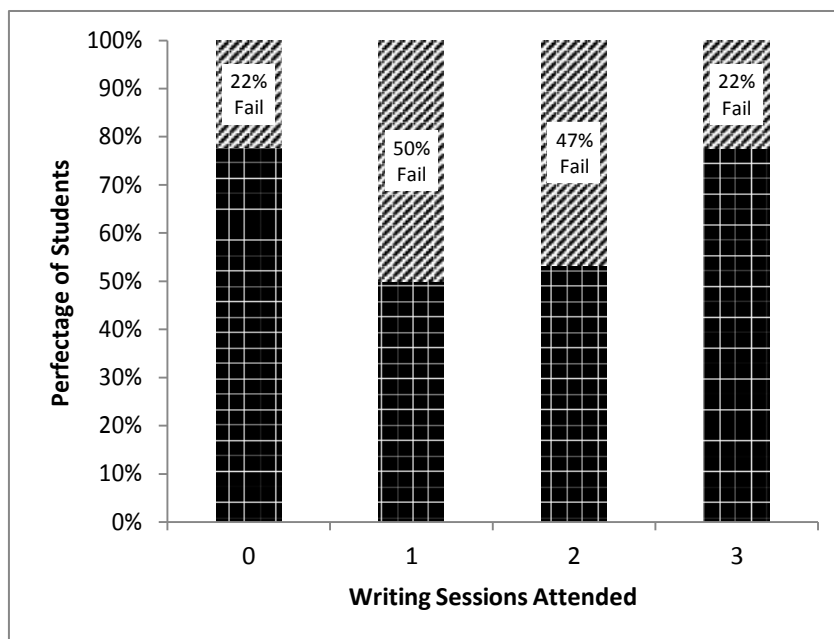
Figure 4: Failure rate of individual report

Peer Assessment

Figure 5 shows PA scores compared to number of EAC sessions attended with the error bars here representing range. No inference can be drawn regarding high attendance rates in EAC and peer assessment scores in both PA1 and PA2. However Malaysian, Vietnamese and Ecuadorian students all show and improved peer assessment factor from PA1 to PA2. In particular Ecuadorian students gain +0.05 over the semester. The Chinese students do not show this trend and appear to drop on average -0.02 points through the semester. Experience shows that scores which drop below 0.95 are significant and often indicative of at-risk students. This shows the program has helped in the acclimatisation of IS in E1 but is not as effective with the Chinese cohort.

The Vietnamese student population was underrepresented in 2013 and 2014 thus no data is available. In the other three cohorts no clear trend can be seen for the effects of EAC on students' peer assessment scores Table 3. There is a steady drop in Chinese students' peer assessment which reflects the need to target this subgroup and is in line with previous findings that show these students struggle the most (Chen & Kavanagh, 2013).

Unconscious bias against IS during the PA scoring process is minimised through strict moderation of each student's scores where outliers and unjustified PA (evaluated through team comments) are removed from calculation. In addition, bias against IS on a whole is unlikely as there has been evidence showing specific subgroups to do well in E1 and E2 (Chen & Kavanagh, 2013).

Table 3: Peer assessment before and after EAC implementation

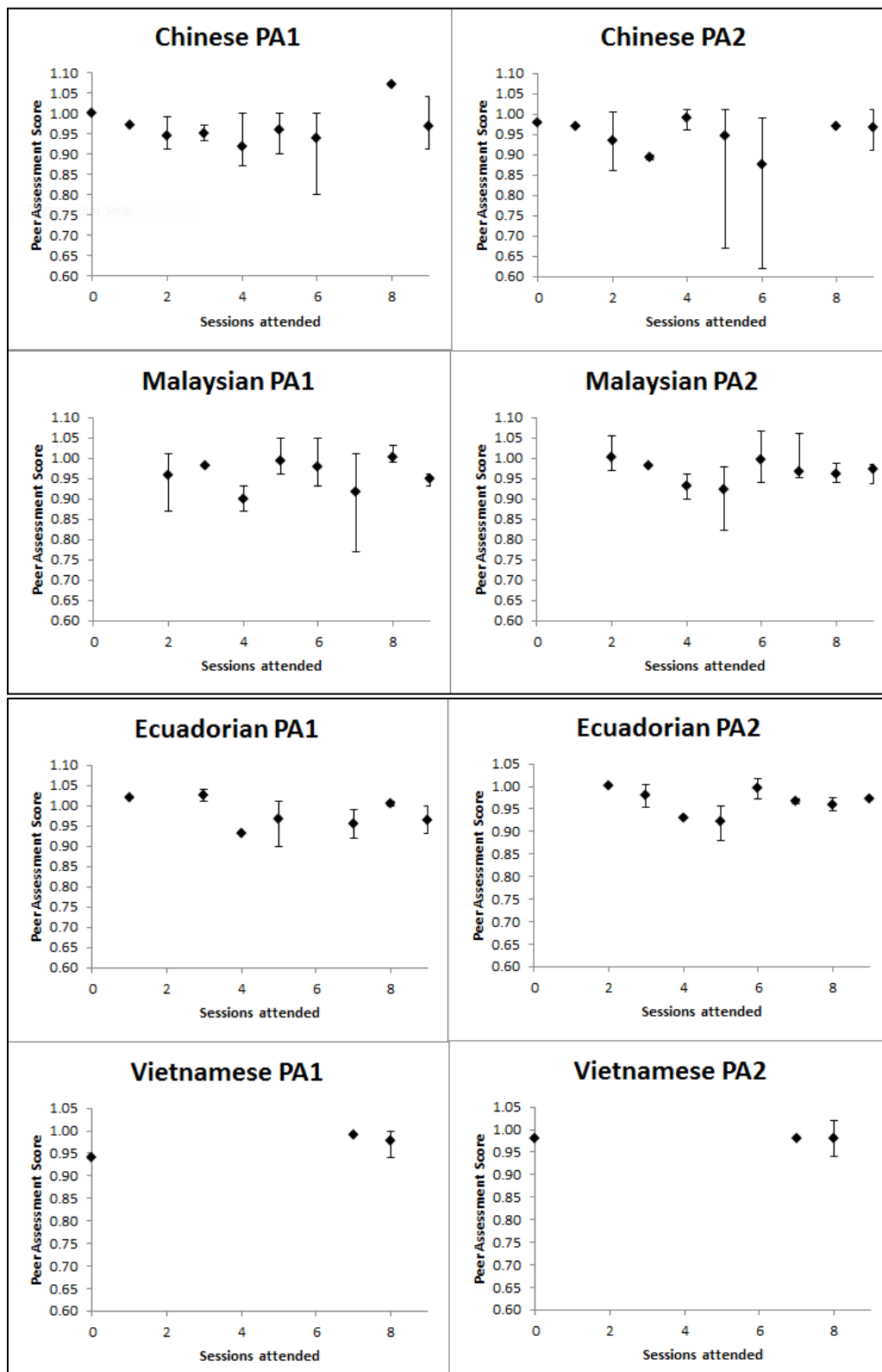|	Peer Assessment 1			Peer Assessment 2		
	Before, 2013	Before, 2014	After, 2015	Before, 2013	Before, 2014	After, 2015
China	0.95	0.96	0.94	0.93	0.92	0.91
Ecuador	-	0.99	0.98	-	1.01	1.03
Malaysia	0.99	0.99	0.96	0.94	0.99	0.97
Vietnam	-	-	0.97	-		0.98

Figure 5: Peer assessment versus sessions attended

Student feedback

The end of program survey was completed mostly by Chinese, Malaysian and Ecuadorian students with only 5 responses from the minority groups. Respondents were all high

achieving students who had scored an equivalent GPA 6 or higher in their pre-tertiary educational institute, therefore responses may not be indicative of an average program participant. Table 4 shows the students' satisfaction with the four main topics covered in EAC. It was not surprising to find that report writing and reflective writing were the two favoured topics as these topics link directly to the assessment tasks in E1. This finding aligns with that reported early in the paper (Watkins and Green (2003), where students were driven by task-orientation, especially those which provided short-term measurable goals. Indeed, the only topics that were 'Not useful' by two students were those not directly connected to assessment: Understanding Australian English, and Speaking Skills.

Table 4: Satisfaction with EAC topics

Topic	Satisfaction			
	Very useful	Useful	Not useful	Did not attend
Understanding Australian English	29% (n=5)	59% (n=10)	12% (n=2)	0% (n=0)
Speaking Skills	24% (n=4)	65% (n=11)	12% (n=2)	0% (n=0)
Report Writing	71% (n=12)	29% (n=5)	0% (n=0)	0% (n=0)
Reflective Writing	53% (n=9)	47% (n=8)	0% (n=0)	0% (n=0)

Students' feedbacks also backed up the need to connect the modules to assessment:

"It was really helpful for everything, especially for the [individual report]"

However, all but one respondent found the course to be helpful (Table 5). In written responses, students raised concerns around the sporadic attendance of their peers which affected the teamwork environment used in many EAC activities. In addition, students indicated that they would prefer more focus on writing skills as they felt oral communication depended heavily on personality and was difficult for many students in the class. This is a surprising finding and indicates that the oral communication modules need to be rethought.

Table 5: Satisfaction of overall EAC program

	Satisfaction			
	Very useful	Useful	Not useful	Did not attend
Overall	41% (n=7)	53% (n=9)	6% (n=1)	0% (n=0)

CONCLUSIONS AND RECOMMENDATIONS

EAC has been demonstrated through improved pass rates and positive student survey feedback to improve IS report writing skills and this is perhaps due to the direct connection to assessment in E1. However the goal of improving communication, and by extension teamwork, does not appear to have been realised. The comparison of peer assessment scores before and after the implementation of EAC shows no improvement overall and a continual decline in Chinese IS performance. Further qualitative data is being collected through interviews with participants to identify the needs of different subgroups. Upon completion of interviews and in conjunction with the results presented herein, the EAC course will be revised and implemented again in 2016 for E1.

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