Improving Student Engagement in a Transnational Engineering Education Programme using Piazza

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SUMMARY

During the past decade, the UK has been expanding its educational programmes and services to universities located in Asia, South America and Africa. In fact, 75% of higher education institutes (HEIs) in the UK expect to develop transnational education (TNE) programmes within the next 3 years. However, there are challenges in ensuring that these TNE programmes are equitable to both sides of the partnership. In particular, the cultural background of the students must be respected. We are currently engaged in a TNE programme with China and we have noticed that student engagement in our first year Microelectronics course is low. We therefore trialled the use of a technology platform called Piazza to help improve student engagement. Based on statistical analysis of surveys that were completed by our students, Piazza has clearly demonstrated high student satisfaction. This can be attributed to the platform's ability to preserve the anonymity, harmony and face-saving characteristics expected from our Chinese students.

INTRODUCTION:

TNE activity involves higher education (HE) institutes delivering educational services and programmes in another country. According to the British Council, TNE is defined as the 'provision of education for students based in a country other than the one in which the awarding institution is located'. UK TNE programmes are now established around the world,

especially with HE institutes located in Malaysia, Singapore, China and the UAE. Such programmes further internationalise UK HE institutes, and at least 75% of UK institutes will be engaged in a TNE programme within the next 3 years.

Nevertheless, student engagement in Glasgow University's joint TNE programme with the University of Electronic Science and Technology of China (UESTC) has been a challenge, especially when cultural differences, language barriers and block-based teaching are considered. Moreover, we believe that active student participation during class discussions has been low due to a fear of public speaking or public rejection. These factors have contributed to limited interaction between staff and students.

To address this issue, we believe that cloud based platforms such as Piazza can provide the necessary space for students and staff to interact with one another. Such platforms support student anonymity and provide the necessary face-saving traits expected from our Chinese students. Furthermore, interaction takes place via text messages and "Chat" forums. Thus, interaction takes place in whole lines instead of one word at a time, which results in intermittent communication (Hartley et al., 2001, Hutchby, 2001). This delayed interaction provides time for students to translate their thoughts into phrases, which can be especially helpful for non-native English speaking students.

LITERATURE REVIEW

China's education system places greater emphasis on the teacher, who is considered the final authority in an academic discipline. This is different from "Western" culture, where students are encouraged to develop their own critical thinking skills. In fact, rigorous debate in Western academia is regarded as an indicator of a healthy academic community (Ingleby and Chung, 2009). Moreover, the literature provides a number of cultural factors that influence relationships between Chinese people (Fan, 2000, Hofstede, 2001). Factors such as face-saving, harmony, trust, collectivism and education strongly affect the way in which Chinese people interact with one another(Gu, 2009, Gu and Maley, 2008, Gu and Schweisfurth, 2006). Perhaps due to these cultural factors Chinese students prefer not to engage directly in rigorous academic debate (Triandis, 1993) and prefer indirect communication, as suggested by (Nguyen et al., 2009). Furthermore, Phuong et al (Mai, 2019) indicated that staff and students should refrain from negative criticisms during group discussions. Therefore, we believe that social engagement platforms such as Piazza are particularly suited to the cultural background of our Chinese students, since they can turn their online discussion forums into active learning environments.

CONTEXT: THE ENGINEERING EDUCATION PROBLEM AND INTERVENTION

During the delivery of our Microelectronics module, we noticed that student engagement is low. We believe that the cultural differences, language barriers and the nature of TNE block teaching have all contributed to this low student engagement. In an effort to improve student engagement, the aim of our intervention was to trial the use of a cloud based online platform called Piazza.

DESCRIPTION OF INTERVENTION / PRACTICE

Our intervention was carried out during one semester of the Microelectronics course. A total of 293 undergraduate students enrolled in Piazza. We introduced students to the platform during one of the lectures and we monitored their online engagement. Students were encouraged to post any queries related to the lecture or laboratory materials, which were then answered by the instructor, the GTAs or other students. This process enabled useful peer to peer discussions. Similarly, teaching assistants and instructors moderated the discussions to ensure that queries were responded to in a satisfactory manner. To investigate the effectiveness of Piazza, we monitored the number of queries posted by students, the percentage of answered questions and the response time to student queries. We also carried out a survey with 10 questions. A total of 23 students completed the survey, which is a response rate of approximately 8%. According to (Nulty, 2008), this is the minimum response rate deemed acceptable for a class size of 300 for a 10% sampling error and 80% confidence level. Results of our intervention are provided in the next section.

EVALUATION OF INTERVENTION / PRACTICE

A snapshot showing the number of active users within the semester is shown in Fig. 1(a). Similarly, Fig. 1(b) shows the number of questions posted each day. Both figures show that students are more active during certain weeks in comparison others. This observation is perhaps due to the nature of our block-teaching, whereby students are more likely to study intensively during a teaching block. Consequently, the graphs provide insight for instructors to design learning activities during the nonteaching blocks of a TNE programme. This ensures students engagement throughout the semester.

According to responses from the completed student surveys, more than 72% of students positively rated their Piazza experience, as shown in figure 2. Specifically, 50% of students agreed that Piazza improved their understanding of the lecture materials, while 33% of agreed that the quality of their lab project improved using the Piazza forum.

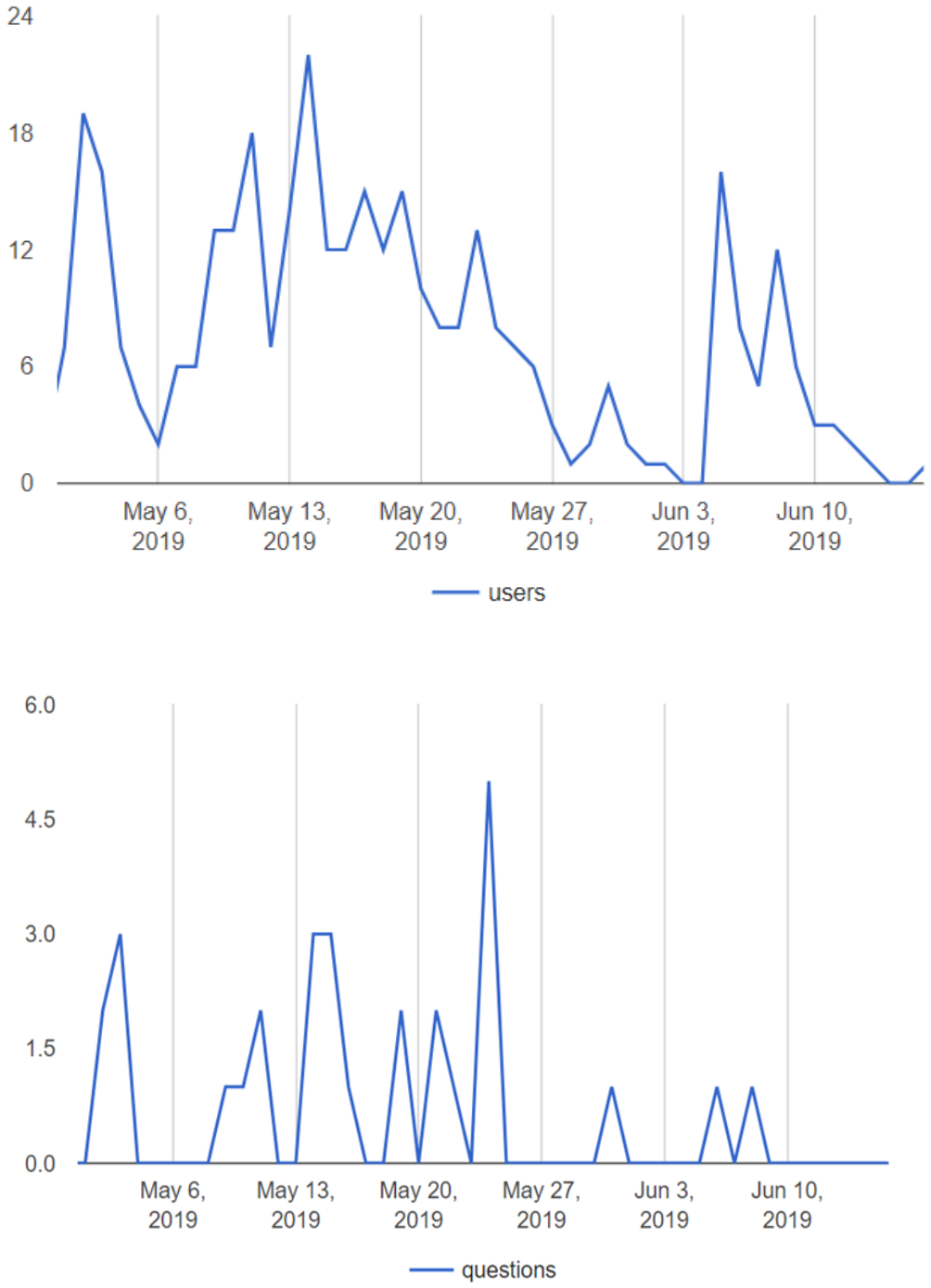

Fig. 1: (a) Number of active users on Piazza each day. (b) Number of questions asked on Piazza each day.

Similarly, students were asked about the least favourable Piazza features. According to their responses, students disliked the weak support received from their peers, as shown in fig 2. Currently, only 25% of student queries were answered by fellow students.

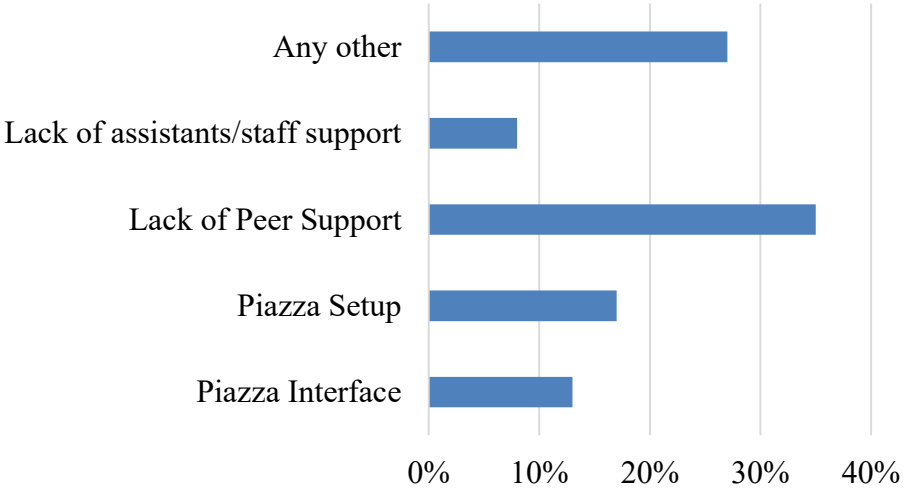

Fig. 2: Students responses to the least favourable features in Piazza.

According to student responses, Piazza is a very useful learning resource, as mentioned by 33% of students. Other useful features include the quick response time to student queries, as shown in figure 3. In fact, the average response time was less than 30 minutes. Moreover, 14% of students liked being anonymous while posting or responding to questions on Piazza.

Fig. 3: Survey results regarding Piazza's most useful features.

A summary of the main Piazza statistics is provided in table 1. Remarkably, almost 95% of student queries were answered within the semester.

Piazza Feature	**Number**
Total number of questions posted on Piazza	57
Number of answered questions	54
Total number of contributions (questions, responses and comments)	393
Number of questions answered by students	14

Table 1 Summary of engagement statistics using Piazza.

DISCUSSION

We analysed student engagement using the Piazza platform. Our results confirm that students interacted well with the platform, since there were a total of 393 contributions throughout the semester. The majority of students (33%) found Piazza as a useful learning resource that helped them understand the teaching materials better. The second most popular feature was the fast response time to student queries, which was less than 30 minutes, on average. Our teaching assistants and students maintained this quick response time, since they took "satisfaction [from] helping others". In fact, this was the third most popular feature of the platform. Perhaps this could be attributed to the collectivist and Confucianist background of our transnational Chinese students

According to the surveys, the collaborative features of Piazza enabled students to improve the quality of their laboratory reports and helped them understand the lecture materials better. Furthermore, almost 95% of student queries were answered within a response time of less than half an hour. This is a remarkable achievement, given the large cohort of students (293) and the 7-hour time difference between Glasgow University and UESTC. This is particularly important, since students typically start posting questions near a submission deadline or before an exam date. However, students complained that peer support from fellow students was low. This was reflected from Piazza, where only 14 out of the 57 questions (approximately 25%) were answered by students. To overcome this, we suggest increasing the number of teaching assistants. While there has been a distinct improvement in student interaction and a positive student experience, we would like to extend this work and monitor the change in grades that this intervention has caused. We also endeavour to encourage more

students to take part in our surveys, since the response rate was currently limited (approximately 8%).

CONCLUSIONS & RECOMMENDATIONS

We carried out an investigation using the Piazza platform to test whether student engagement can be improved in a first year undergraduate engineering course called Microelectronics. According to our results, student engagement is greatest during the teaching blocks of the TNE programme. The platform has enabled students to understand the lecture material better. It has also helped them write better laboratory reports. Moreover, 95% of student questions were answered within an average time of 30 minutes. However, students felt disappointed that few of their fellow colleagues took part in answering their queries (only 25%). Consequently, we aim to encourage more student contributions and greater peer support by offering rewards or incentives to students. In addition, we will investigate whether increasing the number of teaching assistants will reduce student response times to queries.

REFERENCES

Fan, Y. 2000. A Classification of Chinese Culture. *Cross Cultural Management,* 7**,** 3-10

Gu, Q. 2009. Maturity and Interculturality: Chinese Students' Experiences in UK Higher Education. *European Journal of Education,* 44**,** 37-52.

Gu, Q. & Maley, A. 2008. Changing Places: A Study of Chinese Students in the UK. *Language and Intercultural Communication,* 8**,** 224-245.

Gu, Q. & Schweisfurth, M. 2006. Who Adapts? Beyond Cultural Models of 'the' Chinese Learner. *Language, Culture and Curriculum,* 19**,** 74-89.

Hartley, S., Gill, D., Walters, K., Bryant, P. & Carter, F. 2001. Twelve tips for potential distance learners. *Medical Teacher,* 23**,** 12-15.

Hofstede, G. 2001. *Culture's Consequences: Comparing Values, Behaviors, Institutions, and Organizations Across Nations,* Thousand Oaks, CA, Sage.

Hutchby, I. 2001. *Conversation and technology: From the telephone to the Internet,* Cambridge, Polity Press.

Ingleby, R. & Chung, M. 2009. Cultural issues in commencing the supervision of Chinese research students *Australian Universities Review,* 51**,** 42-48.

Mai, N. P. M. 2019. Culturally appropriate face strategies in cooperative learning with insight from cultural neuroscience. *Comparative Education,* 55**,** 66-96.

Nguyen, P. M., Elliott, J., Terlouw, C. & Pilot, A. 2009. Neocolonialism in education: Cooperative Learning in an Asian context. *Comparative Education,* 45**,** 109-130.

Nulty, D. 2008. The adequacy of response rates to online and paper surveys: what can be done? *Assessment & evaluation in higher education,* 33**,** 301-314.

Triandis, H. C. 1993. Cultures and Organizations - Software of the Mind - Hofstede, G. *Administrative Science Quarterly,* 38**,** 132-134.