QUB TEACHING AWARDS

APPLICATION FOR A RISING STARS TEACHING AWARD 2018

(Open to <u>individual</u> academic colleagues who have been teaching within Higher Education for fewer than 9 years)

Dr Andrew McDowell, EEECS

1. PREVIOUS TEACHING AWARDS (200 words maximum)

If you have ever previously won a Queen's Teaching Award, please note the year and category (e.g. Rising Star, Team etc) below. You should also provide a short explanation of how the work outlined in this application differs from the work for which you were previously recognised.

Not Applicable

2. CONTEXT FOR THE APPLICATION (300 words maximum)

Please provide a brief summary of your application and a context for your work. Examples of the information you might include are; the subject you teach or the area of learning support you work in, the type of learning and teaching/learning support activities you are involved in, how many learners are involved, your particular learning and teaching interests and an outline of your overall teaching philosophy?

I have been a lecturer for computing related subjects since November 2012. Initially as a College Lecturer at Belfast Metropolitan College (BMC) before joining QUB in December 2016 as a Lecturer (Education). Throughout my career in education, my teaching responsibilities have included a range of modules in the Further Education, Undergraduate and Post Graduate-Taught domains. The topic areas of these modules vary widely, but include computer programming, website design, database development and project management. For QUB specifically, my teaching contributions to date have been summarised in Table 1.

Table 1: Summary of QUB Teaching Contributions, December 2016 to March 2018.

Module	**Role**	**Class Size**	**Session**	**Contact Time**
CSC1021: Fundamentals of Programming	Tutor	197	2016/17, Sem 2	5 hrs per week
CSC1021: Fundamentals of Programming	Tutor	171	2017/18, Sem 1	5 hrs per week
CSC7056: Software Testing and Verification	Tutor	115	2017/18, Sem 1	4 hrs per week
CSC7086: Software Testing	Tutor	35	2017/18, Sem 1/2	3 hrs per week
CSC3002: Computer Science Project	Supervisor	7	N/A	Variable
CSC7057: Software Development Project	Supervisor	8	N/A	Variable

Having started my career at a Further Education College, my teaching philosophy has been shaped by working with student cohorts that are extremely diverse in their background, outlook, ability and learning attitude. Correspondingly, my approach to teaching is one of recognising the learning needs of each individual and to promote student engagement, both with the lecturer and each other through a social constructivism approach. The result is a positive learning environment, where barriers to learning are mitigated, communication skills are promoted, and self-confidence is enhanced.

One of the success factors for implementing this teaching approach had been the comparatively small class sizes at BMC, with an average of 20 learners enrolled on each module. On transitioning to QUB, however, class size became one of the biggest challenges of maintaining this learner centred approach, as some of my modules attracted circa 200 learners. To this end, as a member of the Educational Research Cluster in EEECS, I have focused my research activities and technical expertise on developing and applying techniques aimed at promoting student engagement in large cohorts, both inside and outside the lecture space. Subsequently, in my time at QUB, these techniques have been, or are confirmed to be disseminated at QUB events, national and international education conferences.

2. DISCUSSION (See Guidance Notes overleaf)

You should illustrate your discussion throughout with reference to specific learning and teaching activities. You should also provide examples of the influence of student feedback on your learning and teaching practice.

(a) How you are promoting and enhancing the learners' experience (1000 words maximum)

On joining QUB, in my first 12 months of teaching I have successfully delivered three modules encompassing some 500 students as outlined in Table 1. These numbers posed two specific challenges to module delivery in line with my teaching philosophy described in the previous section. The first being how to establish the interactive environment necessary for social learning. Specifically, how to open two-way communication between lecturer and learner, particularly in a lecture setting, where many students do not feel comfortable speaking out among a large group of their peers [1]. Secondly, how to provide for individual learning styles within the resource constraints of each module, predominantly the difficult staff-student ratio. Accordingly, the following subsections will outline how each of these challenges have been addressed thus far in my teaching practice.

2.a.1 Utilising Backchannel Communication to Promote Learner Engagement

Well established in the realm of education [1], a backchannel is a complementary interaction that takes place alongside another activity or event. Within my teaching practice, this takes the form of an interactive chatroom using TodaysMeet.com that is active not only during lectures and practical's, but outside scheduled contact sessions as well; a novel approach within EEECS. As illustrated in Figure 1, this backchannel allows learners to anonymously interact with me by posting questions and comments, while also providing a public forum for me to respond. Furthermore, while not illustrated in Figure 1, this service was also used by learners to independently discuss module topics and answer questions posted by other users. Accordingly, when considering the different ways this backchannel has been used, some elements of the previously highlighted social constructivism approach become apparent [2].

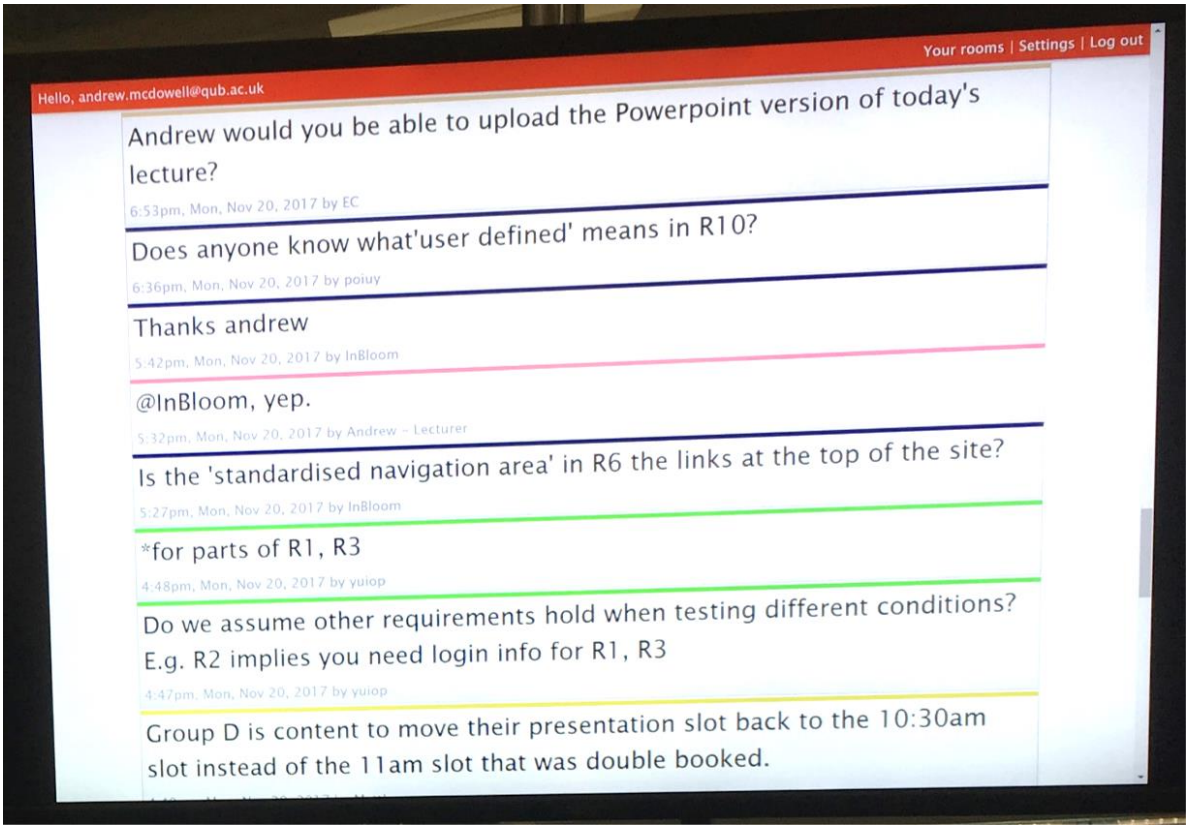

Figure 1: Image showing example of TodaysMeet interactive chat facility being used in module CSC7056, Software Testing and Verification.

When considering the impact of this backchannel service, the result is undeniably positive to our students learning experience. Taking the CSC1021 (2016/17 Sem 2) cohort as an example, 2022 messages were posted to TodaysMeet, of these 1677 were posted by students and 1119 outside scheduled contact sessions. This demonstrates clear uptake of the facility by the learners that is not restricted to scheduled teaching periods. For the Semester 1 2017/18 cohort for CSC1021, Figure 2 provides some example feedback reported in the Teaching Evaluation Questionnaire (TEQ), which demonstrates the continuing positive impact; this is also reflected in the TEQ feedback for CSC7056. Furthermore, when rating how contactable the lecturer was in the TEQ, CSC1021 and CSC7056 provided average scores of 4.9 (n=100) and 5.0 (n=54) respectively. Accordingly, learners clearly feel they can easily communicate with me, an opinion likely influenced by the backchannel provision.

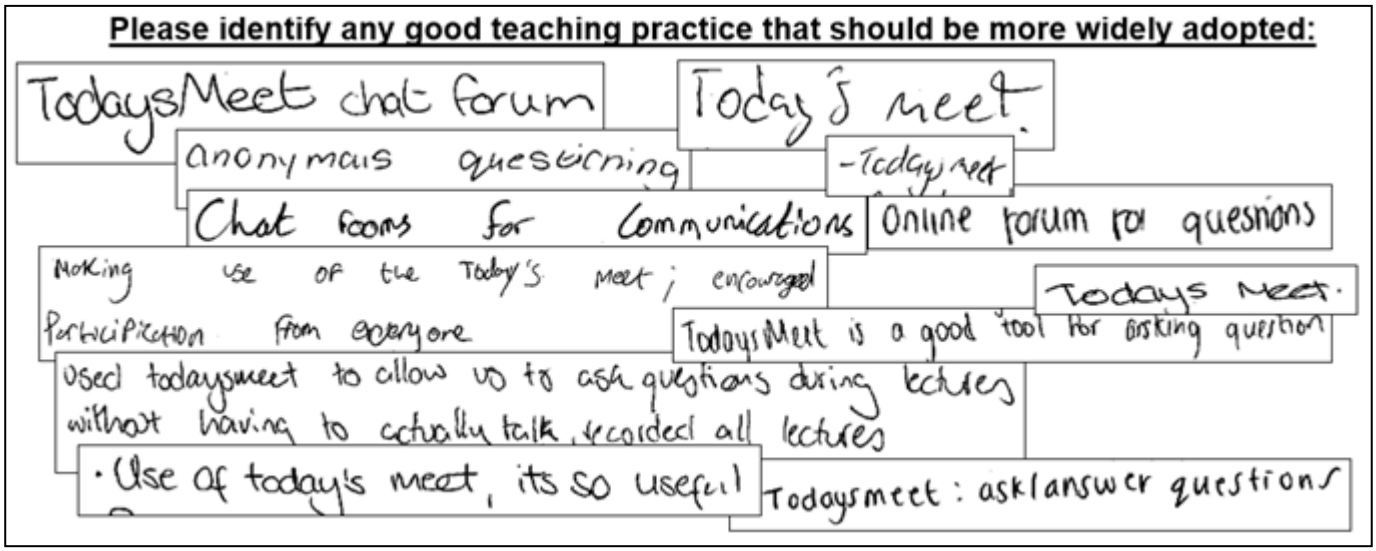

Figure 2: Sample of 12 student responses to the 'good practice' question of the Teaching Evaluation Questionnaire for the Semester 1 2017/18 cohort from the CSC1021 Fundamentals of Programming module.

2.a.2 Meeting Individual Learner Needs

Another challenge associated with large class sizes is in effectively meeting individual learner needs. One approach towards this goal is through the development, organisation and presentation of resources in a format suitable for a wide range of learning styles. Taking the VARK model as an example, learners tend to prefer studying course material in different ways such as Visually, Aurally, from Reading/writing or Kinaesthetically (learn by doing) [3]. Accordingly, while it is not possible to highlight all approaches adopted to satisfy the full range of learning styles in this space, the following text describes two approaches deemed to have the greatest impact on the student learning experience.

Recording of Lecture Content

When planned and conducted effectively, lectures are an excellent way to meet the learning needs of visual and aural learners. Traditionally, however, once they have been delivered, any benefit is limited to the knowledge retained by the students attending and any written notes they have made. Recording lecture material addresses this limitation as students may take and retake lectures as desired. This is particularly useful for reinforcing key content, supporting student revision and providing access to lectures if a student is unable to attend a session. To date, all lectures for the modules listed in Table 1 have been recorded and made available in 69 videos via private playlists on the YouTube video service. As illustrated in Figure 3, this has proved incredibly popular with my learners as evidenced by 11,385 views and 65,645 minutes (1,094.08 hours) of video watch time. Furthermore, 67 students are currently subscribed to receive updates on new video material posted to my channel, this indicates at 21% of my current students are actively monitoring for new video material. Further evidence of the positive impact these video lectures have had are summarised in Figure 4, which highlights the positive reception of the videos by both CSC1021 and CSC7056 student cohorts.

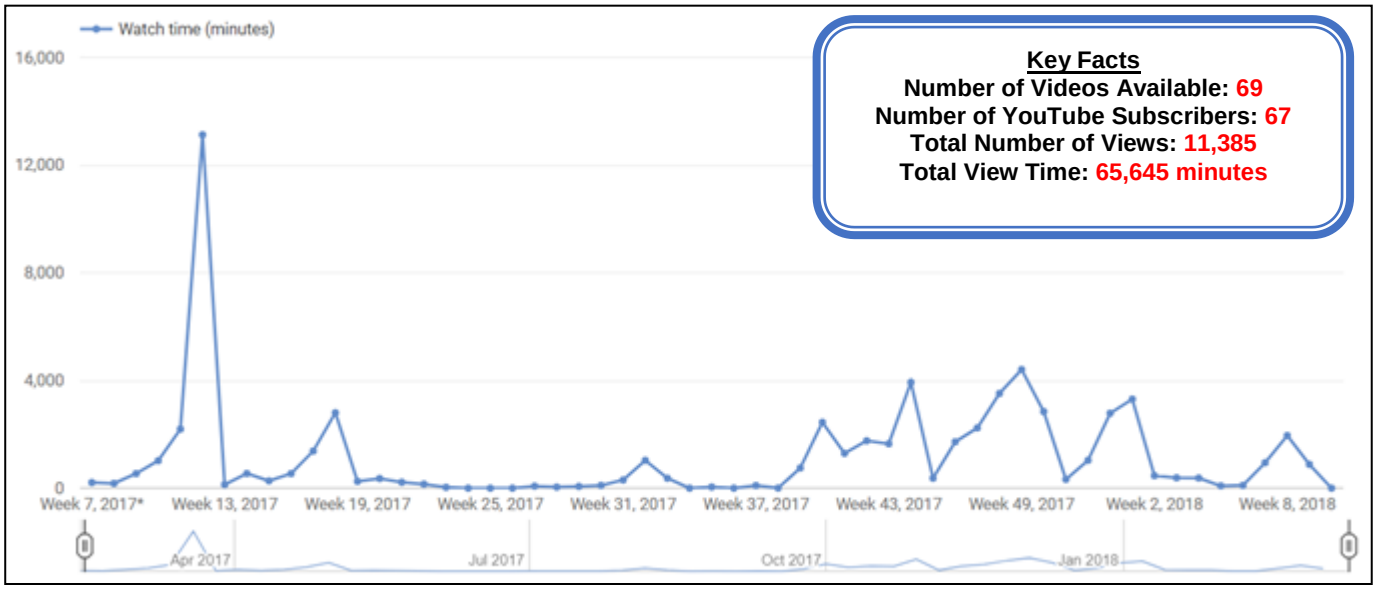

Figure 3: Graph showing number of views on YouTube for all videos posted in relation to the QUB modules listed in Table 1.

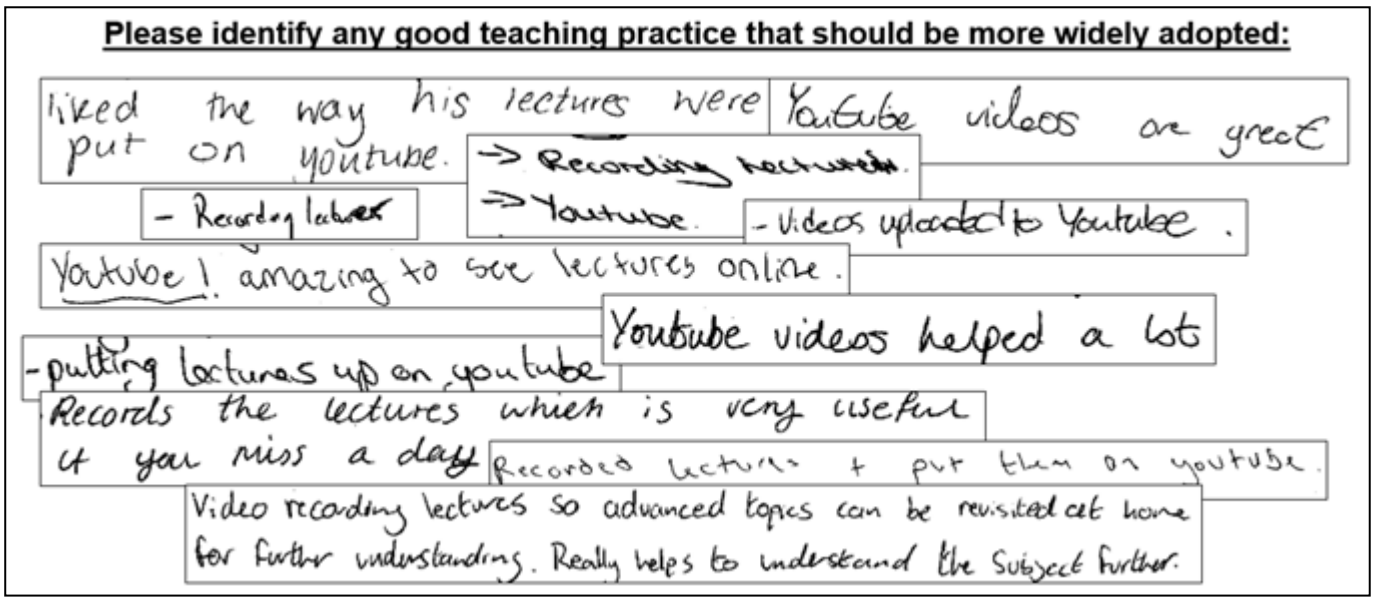

Figure 4: Sample of 11 student responses to the 'good practice' question of the Teaching Evaluation Questionnaire for the cohorts from Semester 1 2017/18 CSC1021 Fundamentals of Programming and CSC7056 Software Testing and Verification.

Promoting Kinaesthetic Learning in the Traditional Lecture Space

Delivering lecture content in a traditional lecture space is an unavoidable reality of university teaching large student cohorts. For the popular kinaesthetic learning type [3] this environment poses a problem as it can be difficult to incorporate practical learning. Accordingly, this section describes two examples of how this problem can be mitigated.

Programming is a skills based module as it involves the construction of computer programs and as with any skill, it cannot be mastered by reading/watching, only by doing. Accordingly, this is the premise for the delivery of lecture sessions in CSC1021. This is achieved by opting for live programming demonstrations aimed at solving real-world business problems, rather than using PowerPoint. Partial and complete sample solutions to these problems are made available before the lectures so students have the option of competing the examples with me in the lecture or to follow along if that is their preference. To facilitate this, students are encouraged to bring their own device along to lectures with them and to make use of the backchannel to ask questions, guide the development of the in-class solution and to solve problems together. As shown in Figure 5, this has been a welcome approach to improving the student learning experience.

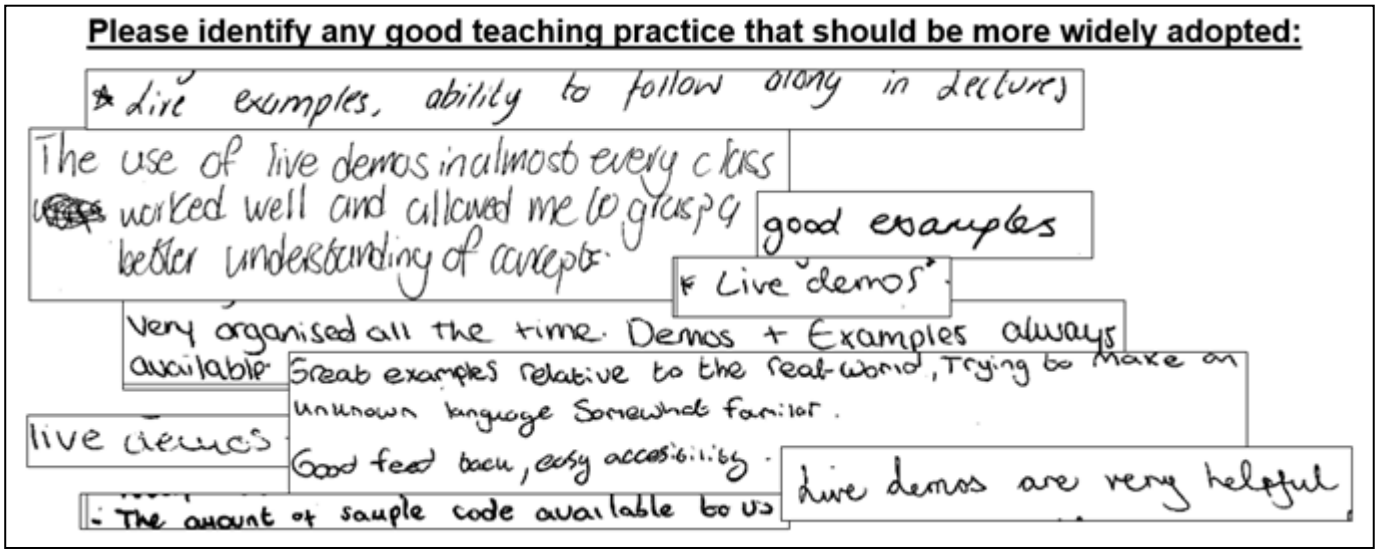

Figure 5: Sample of 9 student responses to the 'good practice' question of the Teaching Evaluation Questionnaire for the cohort from Semester 1 2017/18 in CSC1021 Fundamentals of Programming.

For theory driven modules such software testing, it can be easy to fall into the 'chalk and talk' trap of simply talking for 45-minutes. To break this up, frequent group and individual exercises are incorporated through lectures so that there is interactive activity providing relief at least every 15 minutes. The most popular activity as evidenced in Figure 6 has been the use of topic-end online quizzes with Socrative.com (illustrated in Figure 7) that provides frequent and useful formative feedback to the class.

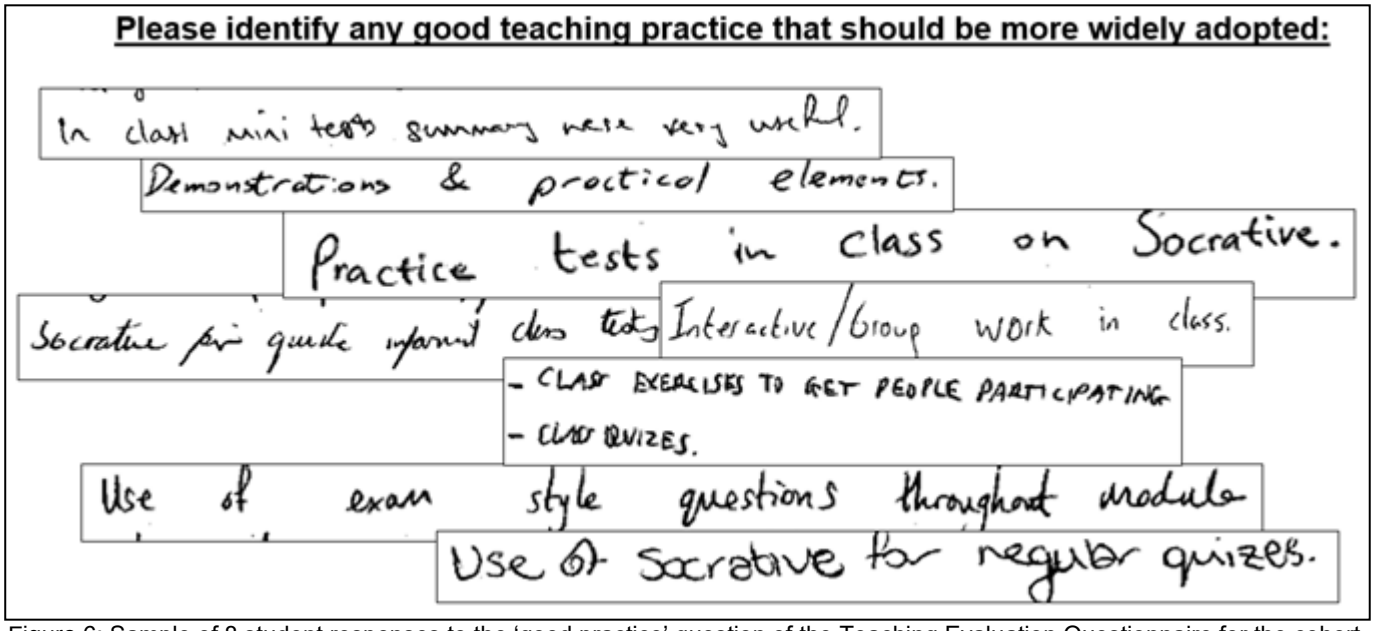

Figure 6: Sample of 8 student responses to the 'good practice' question of the Teaching Evaluation Questionnaire for the cohort from CSC7056 Software Testing and Verification.

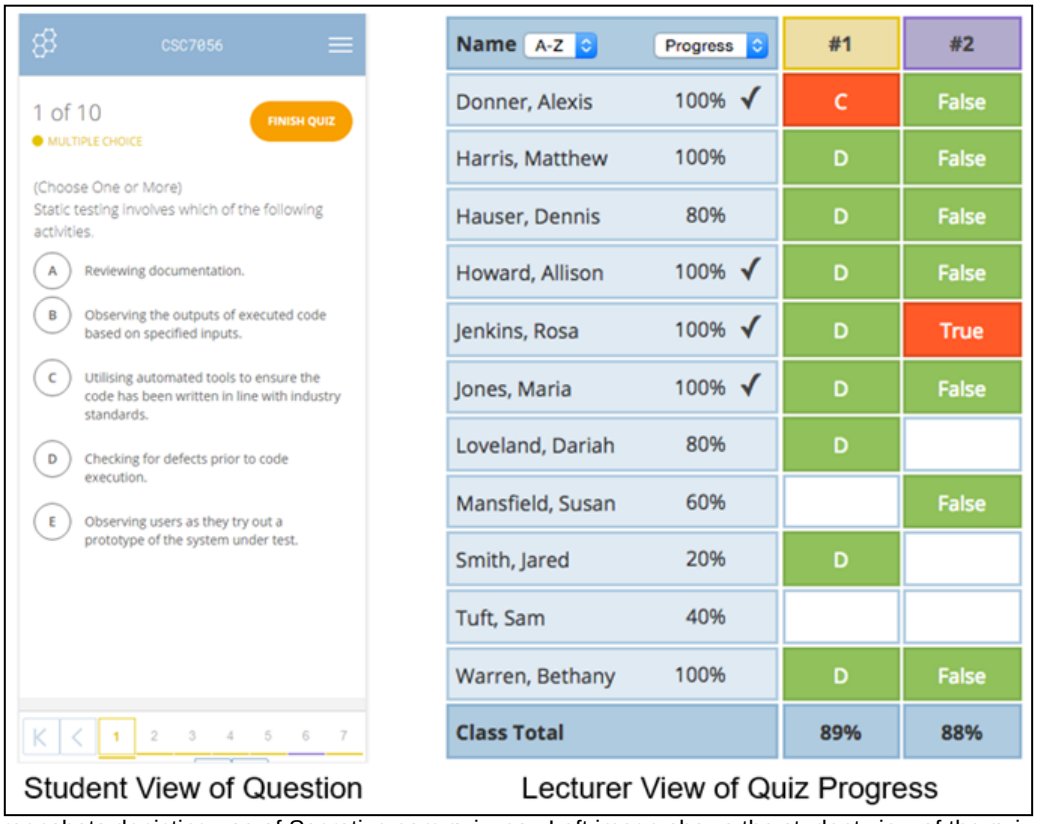

Figure 7: Screenshots depicting use of Socrative.com quizzes. Left image shows the student view of the quiz on a mobile device. Right image shows the lecturer view depicting the progress of an active quiz.

2.a.3 Summary

Having taken steps to address the challenge of a large class size I am pleased to report that in my first year of teaching at QUB, student feedback has been very positive. My latest TEQ scores for CSC7056 and CSC1021 are **4.7/5.0** (n=54) and **4.8/5.0** (n=100) respectively providing clear evidence of this. I am currently delivering CSC7086, which is a part-time blended learning course. The technology and techniques described above have been customised to suit this delivery method. While I currently have no objective statistics to present, informal feedback has been positive and I look forward to reporting a similarly positive message with this cohort as well.

2.a.4 References

[1] F. Bry, V. Gehlen-Baum, and A. Pohl, "Promoting awareness and participation in large class lectures: The digital backchannel backstage.," in *IADIS International Conference esociety*, 2011, pp. 27–34.

[2] B. A. F. Lorna R. Kearns, "Web 2.0 Technologies and Back Channel Communication in an Online Learning Community," *TechTrends*, vol. 54, no. 4, pp. 41–51, Jul. 2010.

[3] N. Fleming, *Teaching and learning styles: VARK strategies*, 2nd ed. Christchurch, 2006.

(b) How you support colleagues and influence support for student learning (maximum 350 words)

The use of TodaysMeet and more generally backchannel technology has proven incredibly popular with our student body in EEECS. Subsequently, to date I have mentored three of my academic colleagues in its operation who are now using it to good effect with their student cohorts. Additionally, my backchannel work is being disseminated further afield, specifically, throughout the university by presenting at the upcoming CED conference, nationally at the HEA STEM conference which took place in January 2018 and finally, internationally as a confirmed presenter at the Education and New Development conference in Budapest, June 2018. Later this year, I plan to compile my backchannel research and development findings into a journal paper for publication.

Beyond disseminating my teaching practices, I support my colleagues and influence student learning though my position as Advisor of Studies (effective August 2017) for the shared Business IT course,

which has circa 300 students enrolled. In addition to meeting with students directly to provide course and pastoral advice, I also take a leading operational role in the courses management by working with other members of staff both in EEECS and the School of Business Management. Managing a shared course can be challenging as I effectively need to coordinate two separate staff pools from two schools, which includes academic and support staff. To support this, I am currently leading an initiative to create a content management system to facilitate the dissemination of information such as student results, the management of academic offences and processing of exceptional circumstances applications.

Finally, I am also a member of several school committees including the computing education committee, school education committee, exceptional circumstances committee, school operations board and the school health and safety committee. Through these forums, I enjoy actively contributing the schools vision and driving my ambitions of improving student engagement with our large student cohorts. Finally, in addition to my role as advisor of studies for BIT, I currently fill in some duties of the stage coordinator for Business IT modules operated by the Business Management School. I am also providing temporary cover for the Computing and Information Technology Advisor of Studies.

(c) Professional development activities you've undertaken and the impact of these activities on your approach (350 words maximum)

Within EEECS I am a key member of the Software Academy, an initiative designed to align our curriculum with the knowledge requirements of local industry. When asked to undertake the software testing module on our MSc conversion course, this was a challenge as it was a subject I had never before delivered. Accordingly, I recognised there was an immediate need to become current and competent in this area. To this end, I studied for, undertook and attained an industry recognised software testing certification (ISTQB in Software Testing). With this knowledge, I was then equipped to design, prepare and deliver an up to date curriculum that would help prepare my learners to undertake the same professional certification. Subsequently, to date, circa 10 students have indicated to me that they wish to take the ISTQB Software Testing certification exam.

I have also worked extensively with local employers to ensure that established modules continue to meet local knowledge requirements. This is achieved by attending employer events, visiting placement students and inviting relevant employers in to provide guest lectures to my classes. Once recent success story has been in working with Price Waterhouse Cooper (PWC) to make the CSC1021 module more relevant to my Business IT students, given that they often come from a business rather than a computing mind-set. Accordingly, through a discussion of the module content with PWC, I was able to secure four paid placement positions for the top performing students at their Tech Academy for a period of one week during the Easter break.

In terms of the impact on the module, it is now taught from the perspective of solving business problems, rather than a purely technical aspect. Specifically, this is integrated with the live demonstration approach, which has received positive feedback. Furthermore, students now have a valuable prize to work towards, beyond achieving a good grade. Those students who performed best in the assignment had the opportunity to present their work and receive detailed feedback from a major organisation, something valuable in itself. The winners have now been selected and will undertake the placement in the coming weeks. Another impact of this prize has been encouraging students to seek out their own placement, with a number of students having also gained an Easter placement with Citi Bank.

Other activities:

Visits to employer premises: 4 since December 2016
Arranged guest lectures by employers: 3 since December 2016
Attendance at educational conferences: 3 since December 2016

Teaching Awards 2018
Guidance

The following are suggestions of the type of information you might wish to include in your analytical application - it is not an exhaustive list. You may also wish to draw upon educational literature within your application.

How you are promoting and enhancing the learners' experience	Evidence of • how you stimulate and inspire learners • how you develop, organise and present resources • how you assess learners appropriately
How you support colleagues and influence support for student learning	Evidence of • ways in which you contribute to the development of colleagues within your area e.g. mentoring, membership of Working Groups/Committees, developing policies etc • how you contribute to institutional initiatives • your contribution to regional/national/international initiatives
Professional development activities you've undertaken and the impact of these activities on your approach	Evidence of • professional development activities undertaken • how you have used these activities to review and enhance your practice • how this has led to improvements for your learners.