QUB TEACHING AWARDS

APPLICATION FOR STUDENT-NOMINATED TEACHING AWARD 2018

Dr Aidan McGowan, EEECS

Nominating Statement

We feel that Aidan deserves this award because we believe he genuinely makes this course enjoyable. He brings an element of fun to his lectures that is hard to achieve but he does it so well. He connects with everyone in the class with interactive activities, group work and many other teaching techniques which make him very dynamic as a lecturer. He also has a genuine care for all of his students which is shown throughout all his hard work. He inspires many of us on a daily basis and is very practical within his lectures, preparing us extremely well for the real world and for interviews. His feedback for exams has been very prompt.

1. PREVIOUS TEACHING AWARDS (200 words maximum)

If you have ever previously won a Queen's University Teaching Award, please note the year and category (eg 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.

I was extremely honoured to receive a Student Nominated Teaching award in 2015. The award text read as following: "*Aidan McGowan uses a student-centred approach to provide a dynamic and personalised learning experience for his students and uses technology, such as lecture capture, to support student development. His practical approach to learning helps prepare students for the workplace*". In their nominating statement, his students stated that, "*Aidan McGowan has, from the first lecture, been a highly successful communicator and mentor*." This application considers new teaching, research and outreach activities that I have engaged with since then, including my founding of the first Queen's Subject Champions group (QUB Code Champions), my successful engagement activities in attracting traditionally unrepresented female students to the computing discipline (as recognised as a Queen's Social Charter project), the successful establishment of a very active postgraduate LinkedIn employability and Alumni platform, the increased funding and success of my QUB Code School outreach activities and the successful publication of action based research into establishing technology based early warning detection systems for struggling students in mass education environments. These activities are all designed to enhance the learning experience for our current and future students.

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, the type of learning and teaching activities you are involved in, how many learners are involved, your particular learning and teaching interests and an outline of your overall teaching philosophy?

Experience and current role

Before teaching in Queen's I gained considerable experience as a Software Engineer. I really enjoyed the programming element of the job however I soon discovered my real love for teaching. I now deliver the programming module to the largest PGT programme in the university and also a final year undergraduate module (200 students). I am also Stage One coordinator to 400 students. I developed and delivered a module of Java programming in Guangdong University China in September 2016. This resulted in 38 successful faculty applications for study at Queen's.

Teaching for Queen's in China

Teaching philosophy

Since my first teaching opportunity I have always felt privileged to be in a position to be able to positively influence others' lives through education. My philosophy of teaching is founded on having a student centred approach. This outlook personifies itself in my teaching with the personalisation of learning, facilitation of learning styles, an industry focus, innovative teaching style and a determination to make my teaching accurate, relevant and fun. I work hard for achieve these ideals and it is rewarding to see these positively and repeatedly articulated in module feedback from the students.

Recent student feedback from TEQs…

by far the best lecturer I've had in university.

ENGAGING AND HAS A VERY SUPPORTIVE OPEN-DOOR POLICY. ALWAYS THERE TO HELP.

Aidan is probably the best lecturer I've ever had - made things interesting, challenging

Aidan is a great lecturer, manages to engage the whole class for the duration of the lecture and is very helpful. Thank you!

Very skilled lecturer with a clear interest in both his subject and his students.

Great lecturer who made the module very interesting and very approachable.

Aiden does a lot beyond just teaching lectures and giving practicals that have been immensly helpful in learning this module such as weekly quizzes to test ourselves and videos put on youtube to explain more clearly difficult concepts

Best lecturer I've experienced at university

Making lectures real and fun

To enhance my lectures students are encouraged to bring along their laptops. The students are then able to dynamically and interactively develop live code within the lecture in a problem solving format. Additionally this enables me have a shortened formative assessment feedback loop and consequently facilitates an informed pacing of the lecture.

Teaching videos

I prerecord snippets of the lectures and make them available to the students via a closed YouTube channel. The videos concentrate on key lecture points. With lecture attendances still on average of 90%, the videos have proved highly popular with over 55,000 student views. Additionally I provide individual assessment feedback via video.

Student feedback on lecture videos…

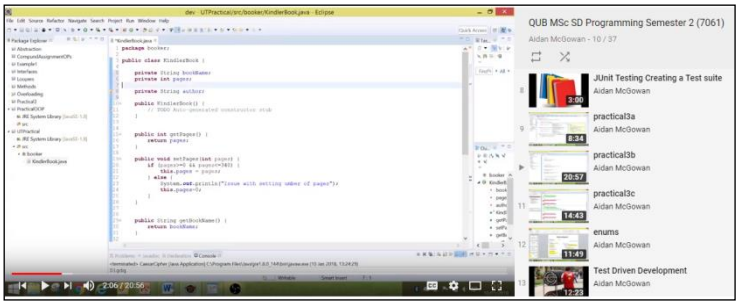
"Very useful resource and was very glad of them. In my opinion, particularly good if you have any condition which affects concentration or alertness as if you miss a bit of the lecture because of said issues; chances are the videos covered it, so thank you."

3. DISCUSSION

(a) How you promote and enhance the learners' experience (1000 words maximum)

Video labs

I continue to develop an innovative blended approach to learning, through the continued development of my Lecture Capture videos and VLE and web based support for the students. This academic year I have also extended this practise to weekly laboratory based sessions in response to student suggestion last year. Traditionally in programming courses, students are timetabled for weekly laboratory practical work sessions which complement the theory being taught that week. The sessions are supported by the lecturer and a number of PhD students and the students work through a series of practical tasks and either refer to the provided solutions or ask if they get "stuck". Due to large cohort numbers and finite physical resources the ability of the lecturer support each student individually in short timed sessions is difficult. Additionally while the final task solution provided is certainly of benefit to understanding, the actual development of programming code is a complex active process and simply providing the final solution hides the evolving engineering decisions associated with building the solution. Therefore before the session I record (audio and video) my development of the solutions and prove these via a closed YouTube channel.



Video lab example hosted on YouTube

Subsequently during and also after the labs, the students attempt the exercises and are free to either view the videos when they complete the exercise or indeed during the exercise to help them move on if they get "stuck". This practice has complemented my blended learning approach to teaching and is readily supported by the new Canvas VLE. The lab videos have proved to be very favourably received by all students this year and it is notable that there has been an increase in module scores.

Some feedback from the students on lab videos…

"The lab videos are extremely beneficial. Very useful that the code is explained as Aidan is coding it, rather than just giving the solution. Best resource I've ever been given at university."

"Recording the labs and uploading them to YouTube is a great addition to the labs themselves. They allow me to complete the lab whenever is practical for me and they are also extremely useful when revising."

"I've found the lab videos essential for understanding each new element we learn"

I plan to extend the practise and there is a real possibility that it could radically and innovatively change the teaching format we use in computing to improve student learning and to help relieve the physical resource issues we currently experience in the school.

QUB Code School

I founded QUB Code School in 2015 to provide an active platform to help encourage pupils to engage with computer science for the long term benefit of student entry in university and help bridge the gap in the local economy that lacks sufficient numbers of software engineers. The initiative is also designed to help attract females to computing. To date, QUB Code School has engaged with over 1250 pupils, and continues to grow, with engagement with over 40 schools planned over the next two years. QUB Code School has previously attracted funding from Caterpillar (2015) of $18K and also recently (2017) attracted funding from CME ($192,000 over 2 years in part with GCSE Teacher upskill training). An application to further support Code School activities (repeat funding) from Caterpillar ($25K) is pending.

School pupils attending a QUB Code School delivered by a Queen's computing student

Impact case study –

We ran several QUB Code School activities in the top performing academic school in Northern Ireland in 2015. The school is all female, has a heavy STEM basis but did not have a computing provision pre 2015 and traditionally few if any of the girls progressed to study Computing in Queen's. Following the Code School activities the school introduced a programming A' Level and GCSE (2017). I was closely involved in the recruitment process for a new computing teacher for the school. This change is very encouraging and likely to have a positive impact in quality and gender imbalance on future enrolments in Queen's. I am also involved in the planning and delivery of the upskilling training of teachers for the new GCSE computing qualification (funded by CME).

The school's IT Coordinator.

"Out of the 14 students (that attended QUB Code School 2016) 10 of them opted for the new GCSE in Digital Technology Computer Programming pathway in September 2017.
From this class we hope to offer A Level Computer Programming either in September 2018 or September 2019''. QUB Code School was also very useful in terms of upskilling the teachers in programming. We appointed a Computing Specialist in Sept 2017, which Aidan was closed involved in the recruitment of.

I also jointly coordinated the design and delivery of the one of the university's pilot subject specific POP programmes (2017/2018). The programme attracted 25 secondary school pupils from disadvantaged backgrounds and following their successful completion of the programme (summer 2017) the students have been given a conditional reduced entry offer for Computer Science.

Queen's Computing Champions

For the past number of years I have engaged with a number of our very high performing students to provide support for in-house EEECS and outreach activities. They have proved to be excellent advocates of the computing discipline, and on that basis I founded *Queen's Computing Champions* in September 2017. Officially recognised and supported by the school the aim of the project is to engage with a small number of high performing, articulate, self-motivated students to provide excellent role models to inform and inspire our current and potential new students. Their enthusiastic involvement at marketing events, development weeks and other student recruitment activities has proven to be of significant benefit in inspiring students making university course choices. Their delivery of QUB Code School has benefit in informing and exciting young school pupils in the computing discipline and potentially in the long term improving our intake. I intend to disseminate the working of the group within the university to potentially expand the practise to subject champions in other faculty and university disciplines.

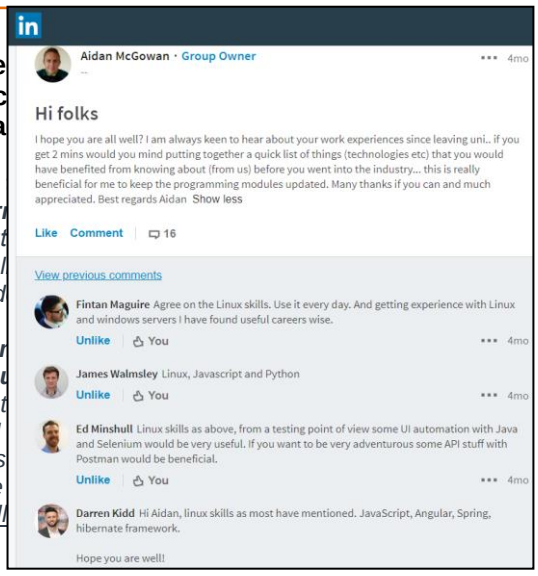
"The Computing Champions scheme pioneered by Aidan provides the School with a fantastic means of growing our outreach activities. Aidan has nurtured and developed a group of Champions who can engage with pupils and teachers in a manner that promotes both the discipline and the University. I have no doubt the scheme will continue to grow and provide wider benefits over the next couple of years."

Dr Phil Hanna, Director of Education. EEECS

The initiative is showcased at http://computingchampions.eeecs.qub.ac.uk

LinkedIn - Computing Current and Alumni group

I have also created and administer a very active LinkedIn alumni group for our past MSc Computing alumni. This has proven to be a vibrant community which has enabled us to elicit up-to-date technical opinions from our former students that are currently employed in the computing industry and helps us shape and keep relevant our teaching. It also has proved a rich source for guest lectures.
In parallel I also have a LinkedIn group for our current PGT computing students, which also has employers included and has helped raise the employability profile of our students. It was directly responsible for the recruitment of many of our conversion Masters computing students in 2017/2018.



Alumni discussion forum helping informing our curriculum

Feedback from Prof. Cathy Craig– Dean of PGT

"Aidan has been instrumental in pioneering the use of LinkedIn to not only connect PGT students with potential employers but also gain invaluable feedback about the course from alumni. I now recommend this ingenious use of a social networking platform to all PGT programmes directors across the Faculty and wider university. As Dean of PGT I think it demonstrates a creative use of technology to not only improve the employability of our students but also raise awareness of where our alumni find employment"

Student evaluations
Whilst not necessarily an indicator of learning, my recent student evaluations follow:

Module	CSC7050 (13-14)	CSC7051 (13-14)	CSC7056 (13-14)	CSC7050 (14-15)	CSC7051 (14-15)	CSC7056 (15-16)	CSC7051 (15-16)	CSC7061 (16-17)	CSC3056 (16-17)
Teaching Evaluation (/5)	**4.9**	**4.9**	**4.9**	**4.9**	**4.9**	**4.9**	**4.9**	**4.8**	**4.8**

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

I have a sustained record of frequent high quality outputs relevant to the discipline of computing and its teaching. Within the last three years these have included a total of seven full, peer reviewed and first author papers. All papers were presented at top five internationally ranked Computer Science education conferences with subsequent publication within the digital libraries of the world's largest technical professional organisation (IEEE) and the world's largest scientific and educational computing society (ACM). The range of publications is deliberately targeted to investigate and help provide answers to some of the significant issues that affect computing teaching and reflect my passion for computing education and the establishment of high performance practices within my own teaching and within the discipline, within the school, faculty and beyond. I have a strong and continuous proactive record of having communicated and disseminated aspects of good practice related to teaching and learning within the University via the CS education cluster and presentations at the Queen's CED Annual Conferences. Evidence of the collaboration with my colleagues within the cluster and beyond is demonstrated from the other authors associated with my publications.

This academic year, on invitation from the HoS, I have been heavily engaged in providing academic mentoring for staff within the school, especially guiding staff on probation in relation to their teaching. This includes providing peer support for lectures that are new the Queen's, including feedback on peer observations and other teaching aspects.

I have worked closely with colleagues to help in the development of the new part time MSc in Software Development. My existing teaching resources have been used to complement the extensive blended learning approach of the new programme to be extended to as an early Canvas VLE adoption.

I have also recently published a paper with IEEE relating to the dearth of females in computing education. Again this is another important issue for Queen's and universities worldwide and consequently the computing industry. It makes recommendations for changes in the current education computing provision in secondary schools and universities.

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

I am currently completing a PhD. While the PhD has proved of significant use in the development of teaching research output it also complements my teaching with the need for me to develop computing systems, thereby giving me hands on, up to date relevant technology exposure which benefits my computing knowledge which is passed onto my students.

The common theme of my PhD is the use of new technologies to provide a better understanding of student learning behaviour, through 1.) the use of wearable devices to measure student heart rate during lectures 2). tracking where students sit in a lecture and its significance to module score and 3.) lecture capture video analytics and tracking of online learning activities via the VLE. The underlying problem I am seeking to address is the current high attrition rate in mass education computing courses. The end goal being the ability to generate key engagement indicators, forming the basis of an early warning system that could be used to facilitate corrective intervention for struggling students in mass education computing environments. The findings so far have been used to inform and improve my practice through the development of increased continuous learning activities, such as weekly online formative assessment quizzes and the monitoring of online learning activity of the students. This has proven to help both assess individual and group progress, thereby enabling corrective teaching activates.

The QUB Code Champions initiative has proven to be a significant professional development experiences for me. It has enabled me to develop a highly motivated self-sustaining group of students. This has necessitated activities including recruitment, day to day management, budget control, training and overall significant leadership opportunities. The engagement with our large and skilled student body in this way benefits the school but also the professional and employability skills of the students.

I regularly review my teaching and especially invite and implement industry comment on my modules. During the summer of 2017 I sent several days with a local software company and the experience gained has helped shape the teaching curriculum within our computing degrees. The relevance of my teaching is reflective of the high employability of the students especially in the MSc Computing conversion course.