Title of Project | Challenge2Code: Encouraging first-year computer-science students to program
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### PROJECT DETAILED

**Outputs:** What has been produced?

The project has produced a platform for programming competitions for first-year students at King’s College London. The coding competition has been run in the current academic year. Competitions run in two streams (beginners and advanced) and can take any number of stages. For this academic year, the competition was run in three stages:

1. Quizzes and simple programming tasks
2. More substantial programming task, with new features added each week
3. Competitive simulation in which students’ programs compete with each other in a simulated electronic market.

The platform supports code written in Java and automatically performs a number of checks, marking students’ submissions completely automatically. Points are assigned based on these markings and students can win prizes during the competition.

For the final stage of the competition we have also organised and ran (together with the KCL Tech Society) a one-day hackathon where groups of students were co-developing trading agents, which were run against each other at the end of the day.

**Outcomes/Impact:** To what extent have you achieved the original aims of the project? Please include examples where possible.

The original aims have been largely achieved. We are still waiting to be able to perform an evaluation of the impact of the project on student learning (this will only be possible after the exams have been marked), but there has already been evidence of a substantial positive buzz among students for the competition.
Supportive factors: What were the main factors that contributed to the successful outcomes of the project?

Three factors contributed substantially to the success of the project:
1. Extensive advertising of the project in 1st year UG modules, especially 4CCS1PRA, run by Dr Zschaler;
2. A very good, engaged, and independent project assistant Piotr Adam Galar; and
3. Good engagement of the KCL Tech student society, especially for the third stage of the competition.

Challenges: Have you experienced any barriers or challenges in developing your project? What could be done to support innovation in the curriculum?

The biggest challenge was getting students to engage. It was initially thought that the competitive and voluntary nature of the project would ensure high participation numbers already. This was indeed true for the first stage, but participation numbers dropped somewhat for the following stages. More advanced students were still participating in both streams, but the less experienced students seemed to feel they were not up to the task and, as a result, often did not even try. We tried countering these feelings with increased ‘marketing’ explicitly challenging these feelings of insufficiency, but with limited success.

There may be a fundamental issue here with students not being provided with sufficient opportunities for success in programming from the start, leading to a perception of mounting difficulty and inability. This may point to a need for redesigning the UG first-year programming modules to include more and continuous opportunities for students to successfully write computer programs.

Recommendations: Based on your study, what recommendations would you make for improving the curriculum and student experience generally? Are there any wider implications of your project for the College/University undergraduate and/or postgraduate curriculum? In particular what would be the implications of introducing your innovation on a large scale across a range of disciplines?

The project addressed a problem specific to the teaching of programming to UG students in a computer-science programme, so an introduction on a wider scale is likely not possible. I am aware that some other Departments are aiming to provide their students with a high-level insight into programming, and a similar competition may be beneficial in these cases. However, it would require a substantial redesign of both the questions and the structure of the competition.

More specifically for computer science, it may be worthwhile rethinking the structure of the first-year programming provision towards an even more practical structure focused on providing opportunities for success throughout. Problem-based and project-based learning may offer good opportunities here.

Dissemination: How has the project been shared with colleagues within and beyond the institution?

The project has been shared verbally with a number of colleagues in the Department in ongoing discussions about the programming provision in the first year of our UG programmes. It will also be disseminated through a poster at the 8th Excellence in Teaching Conference.