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Investigating the impact that the Raspberry Pi online learning project has on teachers' self efficacy in teaching computing

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Overview

Undertaking high-quality professional development is likely to help improve teachers' self-efficacy (belief in their own abilities) and their likelihood of staying in teaching, and computing teachers are significantly more likely than other teachers to identify a need for professional development (Worth & Van den Brande, 2019).

The Raspberry Pi online learning project is part of the National Centre for Computing Education (NCCE) programme. This project aims to enhance subject knowledge, pedagogical skills, and confidence of computing teachers to enable them to successfully deliver the English computing curricula. The courses are free to access and available to all at FutureLearn.com, and are structured to support new and experienced teachers of computing alike.

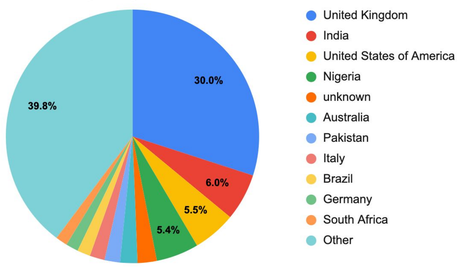
The data gathered about learners on the online courses is taken from two places: course participation data provided by FutureLearn and course surveys provided towards the end of the course.

Learner demographics

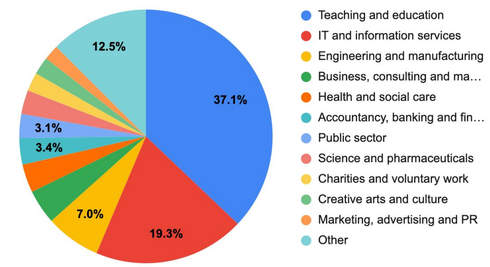
FutureLearn provides anonymised quantitative data about learners participation on individual courses. While the online courses are targeted to teachers in England, they are used by learners all over the world from many different professions and backgrounds.

In 2019, 1251 teachers in England participated in 3205 combined course runs. In the same time period, 39 143 learners participated in our courses from 206 different countries. From these participants, 37.1% are employed in teaching and education and 39.8% live in the UK. This means that from the people who take our courses, a minority are teachers in England.

What country do you live in?



What is your current area of employment?



Course survey of learners

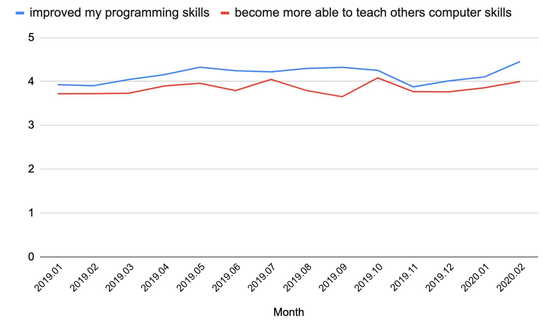
Learners are presented with a course survey in the final week of the course. There are two different surveys: one for courses that include programming, and one for non-programming courses. These surveys ask the learners to rate on a Likert scale how much they agree or disagree with statements about their understanding and confidence of the course content. The results were recorded from 1-5, with 1 meaning "strongly disagree" and 5 "strongly agree". The mean average was calculated for each statement and categorised by month.

In 2019, 1165 learners took the non-programming course survey. Findings from this data showed that 83% of learners agreed that they have become more confident in their understanding of the course material since starting the course. 81% of learners also agreed that they had become more confident in explaining the concepts from the course to others.

Non-programming courses

For the programming courses, 2247 learners completed the survey in 2019. The findings from this survey show that 81% of learners agreed that they have improved their programming skills, and 64% also reported increased confidence in teaching others computer skills.

Programming courses



Conclusions

The initial data from the course surveys indicates that, by the end of a course, the majority of learners report an increase of knowledge gained and confidence in explaining these concepts to others. The difference between learners' confidence in instructing others may be related to the way the programming survey question was phrased specifically as referring to "teaching" rather than "explaining" in the non-programming survey. Another issue with the reliability of this data is that the course surveys do not account for learners who dropped out before reaching the final week of the course. This may result in data that does not fully represent all learners' opinions of the online courses.

More research is needed to further understand the impact of our courses on teachers' self-efficacy and ability to teach computing in England.

A case study of teachers is going to be carried out this year, which will be based around these two questions:

- How do teachers implement what they have learned from online learning with their students in the classroom?
- What are the barriers to teachers taking our courses?

References: Worth, J. and Van den Brande, J. (2019). *Retaining Science, Mathematics and Computing Teachers.* Slough: NFER