Determining the Impact of Teacher Professional Development on Perceived Ability to Teach a Computer Science Principles Course

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Introduction

Computer Science Principles (CSP) is currently being piloted through the College Board as a future Advanced Placement (AP) course starting in the 2016-2017 school year. NSF is providing funding through CS10K grants to help train 10,000 computer science teachers to be highly qualified and effective by 2017. As part of this effort, we held Professional Development (PD) courses during the summers of 2012-2014 to train K12 teachers to teach a CSP curriculum called the Beauty and Joy of Computing (BJC).

Research Questions

As of the 2014 PD, 182 new teachers have been trained, but only 60 of these (33%) have reported teaching a BJC course. Steps are being taken to improve the PD training and increase course adoption. We collected pre- and post-surveys from PD participants to analyze its impact. We used the following questions to structure our exploration of data:

1) What aspects of the PD did teachers find effective and ineffective?
2) How did the PD affect teachers’ perceived ability and intentions to teach a CS Principles course?
3) How did a teacher’s background and level of participation in the PD relate to the effectiveness of the PD?

Background

A report from the Council of Chief State School Officers suggests that the PD must strongly emphasize the specific strategy that it aims to change.

In accordance with these recommendations, the majority of the BJC PD focuses on the use of Snap! programming. It provides ample time for collaboration (especially in the form of pair programming, as well as planning) and lessons that are engaging and expand current practices in the specific context of CSP.

We collected 57 pre-survey responses and 37 matching post-survey responses and analyzed the following:

Teachers rated various aspects of the PD, as well as the PD overall. We determined which aspects were rated significantly higher or lower than the PD overall.

Methodology

We related previous teacher experiences to outcomes in the PD using a multiple linear regression.

The average PD rating was 4.3/5.0, due to high ratings of PD facilitators and content. Teachers’ confidence improved in each core category. Confidence with Snap! was most improved.

Perceived Ability to Teach CS

Survey feedback supports specific PD factors for effective overall at improving teachers’ perceived ability to teach a CSP course.

Survey feedback supports specific PD choices, such as the use of Master Teachers and an emphasis on Snap! programming and equitable practices.

Our models suggest specific teachers may benefit more from PD, such as those with CS or K12 teaching experience. This also suggests a need to make the PD more accessible to teachers without these experiences.