

Developing Online Professional Development for High School Teachers to Teach Computer Science Online

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ABSTRACT

Creating effective professional development is critical to support high school teachers who teach computer science (CS) online. The context of this study is based on a current Research to Practice Partnership (RPP) between the University of North Carolina at Charlotte in the United States and North Carolina Virtual Public School (NCVPS). Ten high school teachers from the NCVPS who teach CS online participated in a summer workshop and recommended design, facilitation, and evaluation strategies to be included in effective professional development (PD). The summer workshop was conducted synchronously via Zoom. It provided the opportunity to discuss teacher perceptions related to the research questions “What design, facilitation, and assessment strategies are helpful to include in an AP Computer Science Advanced course?” and “What recommendations do you have for designing an online professional development course for high school teachers to teach computer science online?” The questions were posed through an online collaborative Jamboard, and the affinity diagram method was used for data collection and document analysis was conducted. The teacher posts were qualitatively analyzed to identify common themes. Findings for professional development on content design included CS content, how to teach CS, and CS tools and activities. For assessment, they recommended content knowledge assessments, including lab assignments, single and pair programming, and coding assessments. They recommended tools for supplemental instruction, integration of discussion boards for interaction, and tools and strategies to provide feedback for professional development.

KEYWORDS

Teacher Professional Development, Computer Science Online, Teacher Knowledge and Skills, Teacher Recommendations

1 EXTENDED ABSTRACT

There is a need for more research to examine online teacher professional development specific to teaching computer science online. The research team recruited ten online computer science teachers from NCVPS to participate in the summer workshop in which they individually posted their responses on the Jamboards which are digital interactive whiteboards. As part of the design of the online PD, the lead teachers recommended including content-related resources, especially for teachers who may not have a strong CS background. In addition, they recommended including resources for teaching CS, including examples of how to teach complex CS concepts, and an outline to guide each week. They also recommended including general teaching resources such as tools to assist with learning activities and collaborative tools to share with each other. During the facilitation of the PD, the lead teachers recommended including resources for supplemental instruction and feedback tools. This included tools for providing feedback in various modalities and a tool repository. When asked about assessment strategies for online PD, the lead teachers recommended focusing on content knowledge assessments - including lab assignments, single and pair programming, and coding assessments. They also recommended providing guidance for creating new programming assessments that were not already online, which students can locate, creating formative assessments through the discussion boards, and using 3-2-1 to get feedback on the course. The findings of this study have implications for teachers, administrators, and designers. Teachers who are currently teaching CS courses in an online setting or for those who wish to teach CS online in the future can benefit from the topics in the PD discussed in this study. Through ongoing, high-quality professional development, CS teachers will continue to strengthen their teaching practice and support the various learners within their online class environments. Administrators can benefit from the findings such that they can offer PD for the teachers on these topics if they teach CS online. Designers who design PD, as well as online CS courses, can benefit from the findings and integrate them into the workshops and courses they design. Finally, students benefit if their teachers are able to attend PD aligned to these topics that make them successful. This project has been funded by the National Science Foundation under Grant No. 2031496.

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