Exploring the Correlation Between Teacher Pedagogical Content Knowledge and Content Knowledge in Computer Science Classrooms

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ABSTRACT

Educators have long claimed that pedagogical content knowledge (PCK), ways of presenting a subject that make it comprehensible to others, is a critical element of student academic success. This poster presents findings from a preliminary study of Computer Science Principles teachers that demonstrate a significant correlation between teacher PCK and student content knowledge. The study describes the measures used to assess PCK, operationalizes the mechanisms for measuring teacher pedagogical content knowledge, shares the results from a multi-level modeling analysis, and identifies methodological improvements for follow-up research. The findings from this initial study show correlations of teacher PCK with student content knowledge while accounting for other teacher- and student-level variables across multiple schools.

KEYWORDS

Computer science education, pedagogical content knowledge, teacher professional development, STEAM, music, broadening participation

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1 CONTEXT AND PRELIMINARY FINDINGS

Our preliminary study of 18 teachers and 473 consenting students reveals how teachers identify and address student misconceptions. A multi-level modeling analysis shows a significant relationship between teacher pedagogical content knowledge and student content knowledge. These findings, coupled with the growth in high school computer science and with Hubbard's research on PCK among computer science teachers [1], suggest that professional learning focus on how CS content is understood and misunderstood by students.

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REFERENCES

[1] Hubbard, A. K. (2017). Learning to Teach Computer Science: Qualitative Insights into Secondary Teachers' Pedagogical Content Knowledge. Ph.D Dissertation. Northwestern University.