

Assessing Professional Identity of Computer Science Teachers: Design and Validation of the CS Teacher Identity Survey

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ABSTRACT

Current efforts to expand K-12 CS education highlight the great need of well-prepared CS teachers with a strong sense of professional identity. This study proposes the CS teacher identity scale, a quantitative instrument for measuring CS teachers' sense of professional identity. The survey was piloted through a national teacher survey and tested for its reliability, dimensionality, and validity. The analysis reveals a four-factor solution for the CS teacher identity scale.

CCS CONCEPTS

- Social and professional topics~Computing Education

KEYWORDS

Computer Science Teachers, Teacher Identity, Identity Survey

1. INTRODUCTION AND BACKGROUND

Teacher identity is broadly defined as “being recognized as a certain kind of teacher by self or others” [2]. The emerging literature suggests that teacher identity is central to sustaining motivation, efficacy, job satisfaction and commitment, and these attributes are crucial in determining teacher retention [1]. The dramatic growth in CS education recently has been driven by teachers from other subjects learning to teach CS as both standalone courses and as content integrated into their existing STEM courses. More and more teachers are facing the challenges of professionally identifying their major teaching roles for CS. Fostering CS teaching identity can be an important step toward high quality CS learning experiences.

Based on systematic reviews into teacher identity instruments [3, 5], CS teacher identity is decomposed into six domains: Self-Identification, Community/Sense of Belonging, Interest and Value of Teaching CS, Learning/Striving to Teach Well, Confidence in Teaching CS, and Commitment to Teaching CS. We adapted the Teacher Identity Measurement Scale [4] with new items proposed for these domains.

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The survey started with 22 Likert scale items and was piloted through a national CS teacher survey.

2. METHODS AND RESULTS

In total, 3540 teachers completed the national CS teacher survey. The dataset was randomly split into three subsets to serve three unique types of factor analysis: a confirmatory factor analysis of the theoretical model, exploratory factor analyses (EFAs) to determine a better latent structure of the identity constructs, and a confirmatory factor analysis conducted on the best EFA model.

A 4-factor model was selected as the final model. This model indicates that CS teacher identity may comprise four components. (1) Committed Teaching Identity: Teachers see themselves as a CS teacher with confidence in CS content, take actions to be good teachers, and intend to continue teaching CS. This component combines the three proposed constructs: Self-Identification, Learning and Commitment. (2) CS Pedagogical Confidence: Confidence in teaching CS with specific pedagogies to serve diverse students. This construct is specified with seven Confidence items. (3) Confidence to Engage Students: Confidence in motivating and engaging students in CS learning. (4) Sense of Community belonging: Teachers' sense of belonging to a community of CS teachers.

3. CONTRIBUTIONS AND FUTURE WORK

This study is a first step towards a quantitative measurement for CS teacher identity. We were able to test the CS teacher identity scale through a large national sample. The instrument can be used to better understand and strengthen the professional identity of CS teachers. We plan to revise the survey based on the selected model, and test the revised scale.

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