

Who AM I? Understanding High School Computer Science Teachers' Professional Identity

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ABSTRACT

Quality computer science (CS) teachers are critical for secondary computing education. In addition to increasing the number of high school (HS) CS teachers, there is a great need for supporting those teachers to grow and stay as committed, effective teachers. Recent literature on teacher education suggests that teachers' sense of commitment and (other aspects of) teaching profession is tightly linked with their teacher identity. However, the current educational system in the U.S. does not provide typical contexts for teachers to build a sense of identity as CS teachers. This study is intended to gain an initial understanding of CS teachers' perceptions about their own professional identity and potential factors that might contribute to these perceptions. Our findings indicate that current HS teachers teaching CS courses do not necessarily identify themselves as CS teachers. They have different perceptions related to CS teaching. Four kinds of factors can contribute to these perceptions: teachers' educational background and certification, CS curriculum and department hierarchy, availability of CS teacher community, and teachers' perceptions about the field of CS.

Categories and Subject Descriptors

K.3.2 [Computers and Education]: Computer and Information Science Education—*computer science education*.

General Terms

Design, Experimentation, Theory.

Keywords

HS CS Teacher, CS Teacher Identity, Professional Development, Community

1. INTRODUCTION

To achieve quality CS education, we need quality CS teachers. The reality is: Too few high schools in the U.S. have computing/CS teachers with formal CS training and many schools do not have CS teacher at all [19]. In addition to the need for increasing the number of CS teachers, there is also the need for supporting those teachers we have recruited and trained to become better teachers and continue teaching CS.

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In secondary education, we are facing a big challenge of sustaining teachers overall [16]. Teacher turnover is significantly high and especially beginning teacher attrition is a serious problem [11]. Based on an analysis from the National Center for Education Statistics, it is estimated that almost a third of America's teachers leave the teaching profession sometime during the first three years of teaching, and almost half leave within five years [12]. In CS education, we are working on preparing more CS teachers. The NSF CS/10K project is aimed at preparing 10,000 CS teachers by 2015 [6]. Looking forward to 2015, we have 10,000 well prepared teachers including many beginning teachers. If similar teacher turnover rate happens to these CS teachers, we are going to lose around half of them by 2020. Therefore, a key question for us is: how can we sustain those good CS teachers we have recruited, trained and hired?

Much recent literature on teacher education highlights the importance of teachers developing a professional identity as teachers of a specific subject [2, 3]. This literature suggests that a strong sense of teacher identity is a major indicator or feature of committed, quality teachers [4, 5, 7]. Researchers have also identified contextual factors that significantly influence teachers' identity such as educational background, pre-service training and school culture [2,]. For HS CS teachers, it could be a big issue to establish professional identity under the current educational system, without consistent certificate standards and with computing usually excluded from the core curriculum [8, 19]. In the U.S., there is no CS background requirement or consistent certificate process specifically for CS teaching as teachers in some other counties do [17]. HS CS teachers usually do not have a computing department they can belong to, in contrast to most post-secondary computing faculty or secondary teachers teaching subjects under the core curriculum. We will offer more discussion about these challenges in the next section. In brief, the current secondary education system in the U.S. does not provide *typical* contexts for teachers to build a sense of identity as CS teachers. Then, what kind of identity do our current HS CS teachers hold?

This study is intended to gain an initial understanding of CS teachers' perceptions about their own professional identity and potential factors that might contribute to these perceptions. The two research questions explored in this study are: 1. What kind of professional identities do current HS CS teachers hold? 2. What influences teachers' sense of identity as a CS teacher?

2. THEORETICAL FRAMEWORK

2.1 Teacher Identity Matters

Teacher identity theory offers a particular conceptual lens for us to understand the issue of teacher commitment and retention. Teacher (professional) identity is broadly defined as being

recognized as a certain kind of teacher by self or others [2, 3, 9]. It reflects a subtle dimension of the complex and ongoing process through which teachers get to know themselves, their students, and the subject matter they teach [4]. The emerging literature on teacher identity suggests that identity reveals a set of values, beliefs and goals that shape how teachers makes sense of their own teaching experiences and thereby influences the way teachers teach, the way they develop as teachers, and their attitudes toward educational changes [3]. For example, Margolis et al [14] found that teachers who did not value CS as a priority for students to learn would not be willing to invest energy to recruit students into CS courses. Especially, teacher identity is central to sustaining motivation, efficacy, job satisfaction and commitment, and these attributes are crucial in determining whether teachers leave or stay in the profession [5, 7]. For example, Hong [10] found that dropout teachers indicated more negative aspects of their teacher identity. The essential roles of teacher identity inspire us to look at the professional identity that HS CS teachers bring into their teaching, which has the potential to offer insights for supporting and sustaining CS teachers.

2.2 Challenges of Building Professional Identity for HS CS Teachers

For HS CS teachers, the evolving, young nature of the computing field and its educational practice adds a few challenges of its own to the general list of challenges for HS teachers to building their sense of professional identity as CS teachers.

First, the relative newness and evolving nature of the computing field itself brings big challenges for teachers to identify the subject matter they are teaching. The study of CS as a scientific discipline is often confused with other uses of computing technology within education, such as computer applications and educational technology [8]. Second, the current certification situation makes it more difficult for teachers to identify themselves as CS teachers. In many states, a CS teaching certificate is not required in order to teach CS. Teachers with little or no CS training are frequently assigned to teach CS courses. Where certification requirements do exist, they often have no connection to CS content [19]. Moreover, CS courses are often offered in different programs (mainly Business or Math), which do not treat CS as an individual academic discipline. Such a confusing situation makes it difficult for teachers to identify what they are teaching and what kind of teachers they are. Third, since there are still very few CS teachers, these teachers are especially isolated. This kind of isolation might prevent them from building a sense of belonging and affiliation with other CS teachers.

Considering the above challenges, it can be a big issue for teachers to build a sense of identity as CS teachers. In this paper, we would like to understand what kind of professional identities current CS teachers bring into their teaching. In addition to teachers' self-identification (e.g., as a CS teacher or not), we examine specific features of their identity to further understand what they mean by saying "I'm (not) a CS teacher". Informed by the theoretical framework of social identity [18], mathematics identities [15] and science teacher identity [13], we specifically look at the following three aspects of their teacher identity:

- Attitudes and values

This element involves teachers' attitudes and values related to teaching CS, e.g., their sense of values of learning and teaching CS, and confidence in their own abilities to teach CS.

- Motivation and commitment

This element examines teachers' motivational dimension related to their CS teaching, especially their motivation to strive to teach well, to continue teaching CS, and to grow the CS program.

- Sense of belonging/affiliation

This element examines teachers' sense of awareness and ownership of being a member of a certain social group related to their teaching in CS (e.g., a member of a CS teacher community).

3. STUDY METHOD

3.1 Data Collection

One major method in teacher identity research is called narrative inquiry [1]. This method suggests that researchers examine teacher identity through interviewing teachers and then analyzing teachers' narrations on their teaching experiences. In this study, we conducted semi-structured interviews with nine HS CS teachers in Atlanta, who taught at least one of the introductory CS courses listed in the computing pathway (the Georgia computing curriculum.) All these teachers were teaching at least some form of CS involving introductory programming. Before the interview, they completed a demographic questionnaire.

The interview lasted around 60-90 minutes. Interview questions were framed by the three aspects of teacher identity features introduced above. We asked participants to introduce themselves and what they were teach, to tell the stories of how they started teaching CS, how they felt about their teaching, and challenges they faced in teaching CS. Interview transcripts were analyzed in terms of the sense of identity teachers perceived and what contributed to those perceptions. The process of analysis is a conceptual qualitative discourse analysis focusing on the experiences, feelings, and beliefs described by the participants [1].

3.2 Participant Background

Eight of the nine participants came from public schools and one teacher taught at a private school. Their CS teaching experience varied from 2 years to over 10 years, and their school accommodated from less than 500 students to over 2000 students. In the public schools, CS courses were offered in the Business program under the Career, Technical and Agricultural Education (CTAE) department. In the private school, CS courses were offered in the Business and Computer Technology department, which served students similarly to the Business program in public schools. Therefore, there was no big difference in terms of where CS courses were offered among these schools.

Table 1 Participant Professional Backgrounds

Teacher	Educational Background	Certificate
Alex	Electrical Engineering; Management	Technology Education; Business Education
Becky	CIS	Business Education
Bob	CIS; Math Education	Technology Education; Business Education
Ryan	Political Science; Leadership	N/A
Cindy	Math Education	Math Education
John	CS and Math; Math Education	Math Education
Pat	Business	Business Education
May	Management; Elementary Education	Business Education
Rose	Business Education	Business Education

Table 1 lists these teachers' professional background information. All the teacher names mentioned in this paper are pseudonyms. Only three teachers held a computing related degree: one in CS and two in CIS (Computer Information Systems). As to certification status, Ryan did not pursue a teacher certificate since that was not required in a private school. Six of the remaining eight teachers got a Business Education certificate, which allowed them to teach CS courses. Both of the two teachers holding a Math degree got a Math Education certificate and belonged to the Math department. The six teachers holding a Business Education certificate belonged to the Business department in their schools.

4. FINDINGS

This section first presents how the participants self-identified themselves as teachers in different subjects with different identity features. The second part of this section reports how the participants explained their perceptions as teachers in different subjects: what different background aspects and other factors contributed to their self-perceptions as a CS teacher (or not).

4.1 Perceived (CS) Teacher Identity: Self-Identification and Identity Features

The participants were explicitly asked to introduce themselves and clarify their own teacher identity. Overall, these nine teachers self-identified themselves either as a CS teacher, as a Business teacher, or as both a CS teacher and teacher in another subject (Math or Business). Section 4.1.1 - 4.1.3 present information about these three kinds of teacher identities with (varied) identity features indicated by these teachers, such as their confidence in teaching CS, their beliefs in the values of learning CS, their motivation to seek professional development and commitment in teaching CS.

4.1.1 *I'm a CS Teacher*

Four teachers saw themselves as CS teachers: Alex, Becky, Bob and Ryan. They used words like "computer science teacher", "computer teacher", and "programming teacher" to introduce themselves. In particular, Ryan called himself a programming teacher and explained that he didn't label himself as a CS teacher to avoid confusion about the meaning of CS teacher.

[Ryan]: "I would lump myself more as a Programming teacher, because that is most of my courses... I think people don't understand what it means to be a [CS] teacher. It means different things to different people. In the past when I've said that, people want to talk about typing... That's a skill, but it's not what I'm teaching actually."

These teachers understood the broad scope of the field of CS and believed the values for students to learn CS. However, not all of them were committed to CS teaching since it was not in the core curriculum. One teacher (Alex), who was teaching mainly CS, explicitly expressed a sense of crisis as a CS teacher, which drove him to preparing a Math Education certificate for job security.

[Alex]: "High schools are much more interested in the core subjects: Math, English, Science, and Social Studies, which have the graduation test... They're much more interested in those than the Career Technology classes [including CS]. So, I just took the Math test because I wanted to make sure that I could find a job in a school that I might want to go to."

Three of them felt they were confident in teaching CS courses with a few years of teaching experience. Meanwhile, another teacher, Becky, was still struggling with how to teach CS well.

Even if she held a background in CIS and had been teaching CS for several years, she did not feel confident. She perceived CS as hard to teach for a couple of reasons.

[Becky]: "I struggle with giving everyone the material and being able to explain it... I struggle with how to be creative. I have a problem with trying to make the programs have meaning to them... It is hard to teach. It's hard knowing how to teach it... It's hard to explain... I would have to definitely update my skills... When I look at kids' codes, they think I should know it as soon as I look at it... I have to study it just like they do."

We also saw another common feature among these four teachers, who self-identified as a CS teacher: they all saw the evolving nature of CS and would like to learn more to keep updated and teach these courses better. In addition, since they were isolated, they all wanted to keep connected and collaborate with other teachers to address challenges in teaching CS.

[Ryan]: "The most difficult thing has been when machines don't quite handle the software interface and it changes. Also, I had some issues with language and paradigm shifts from procedural to object-oriented. It was an interesting journey of trying to navigate that. That would have been probably better done if I had initiated more contact with other teachers and had a group to work with. It's so important to have a group of peers you have collaboration with."

4.1.2 *Mixed: I'm a CS and X Teacher*

Three teachers identified themselves as teachers in both CS and another subject: Cindy, John and Pat. Cindy was a Math and CS teacher, seeing CS as part of Math. John saw himself as both a CS and Math teacher, but more passionate in CS. Pat claimed she was a Business teacher as well as a CS teacher.

• **Cindy: "I'm a Math teacher" & "CS is Applied Math."**

Cindy reported herself teaching both (one) Math and (three) CS courses, but she was really a Math teacher since she believed that CS was part of Math. Also, she would like to stay teaching Math instead of moving to teaching all CS.

[Cindy]: "I am a Math certified teacher, so I am a Math teacher who teaches [CS]. I really think that [CS] is a Math course. It's like Applied Math. You're applying what you know in Math to that... I want to stay in the Math area as well. I don't want to go all the way over to that other side, because I was trained to be a Math teacher."

Considering CS as part of Math, she used lots of Math problems as examples to be solved by programming in her CS courses. For example, she asked the students to turn the quadratic formula or the distance formula into a Java statement, or asking them to take a 2D matrix and figure out a magic square by writing a code.

• **John: "I'm a Math and CS teacher, but I'm a better Math teacher."**

John identified himself as a Math and CS teacher, but emphasized that he was more passionate about teaching CS. He studied Math as well to help himself to better understand CS topics.

[John]: "I would introduce myself as a Math and CS teacher... I'm definitely more passionate about teaching CS. I enjoy teaching CS... The main reason I'm not teaching it

full-time is, there isn't really a place where I could make that a full-time job... CS was my first choice as a major. I ended up adding a Math degree so I would be a little bit more likely to understand some complex topics in CS."

However, he believed he was a better Math teacher due to the isolation of CS teachers, while the Math teacher community was available to him.

[John]: "Even though I feel like I know CS better than Math and I'm more passionate about it, I still think I'm a better Math teacher, just because I've had so much support. Whenever I have problems, I can talk with the people that I work with, who have taught for many years in Math. Every day, I'm eating lunch with Math teachers. So, we can talk about our problems. With CS, I've got nobody to talk to."

• **Pat: "I'm the only Marketing teacher and I'm also the only CS teacher."**

This teacher saw herself as both a Marketing (part of Business) and CS teacher. She was striving to teach an individual CS course instead of sessions with CS and Business combined.

[Pat]: "This semester, I teach one section of Beginning Programming in a class combined with a section of Intermediate Programming, and one section of Marketing Principles. Next semester, I look to include a class where I might see Beginning Programming, Intermediate Programming, and AP CS in one class, Marketing Principles and Sales and Promotion in one class at one time."

• **Teacher isolation and sense of affiliation/community**

All these three teachers reported the issue of (CS) teacher isolation and perceived the lack of a sense of affiliation. They expressed the desire to connect with other CS teachers. However, they did not see some Business teachers as their peers who they could collaborate with.

[Cindy]: "I don't have many colleagues in the county that I can turn to... I've sat and talked to people... They all have their own way of wanting to do things [in CS]... We have a lot of people who are Business teachers with no idea what they're doing with this class. I'm hoping to meet more people that I can collaborate with and that are more like-minded to my style of teaching so that I can get more ideas."

Another teacher, Pat, further pointed out that putting some Business teachers who did not want to teach CS into the CS education community hurt the program.

[Pat]: "One of the biggest problems is that [CS] has been lumped in with Business and many of these teachers want nothing to do with CS. [They] consider it too hard to learn, don't have the background to be effective in it, and want to go back to keyboarding and computer applications. They hurt the program because they 'have' to teach... If a teacher wants to learn it and teach it they can-- but so many don't."

4.1.3 I'm a Business Teacher

The remaining two teachers (May and Rose) saw themselves as Business teachers. With a Business Education certificate, they saw their main responsibility in teaching Business, no matter if they were teaching mainly CS (May) or only one CS course (Rose).

Both of them saw learning computing or CS as important to every student. However, May was struggling with differentiating computer applications from computing or CS. Overall, she saw

computing as being able to operate the computer (e.g., creating a Word document), while CS was advanced programming and was only for those smart students.

[May]: "I think, [CS] is more for really, really smart people... If I have to go take this CS degree, it's going to be really hard... I think CS is a much higher level... When I say computing, I think of computing as being able to operate the computer, being able to type a Word document, being able to use the Internet... I believe most students can successfully take and complete Computing in the Modern World, but it takes a little higher level of intelligence to complete the Programming and AP CS."

May reported that although she was isolated as the only one who taught CS courses, she felt confident in teaching those courses. First, she gained confidence in the process of teaching every year. Second, she felt the general resources she could access from the CTAE department in her local county and the state was sufficient for her. She was not looking for further learning and collaboration opportunities from other teachers.

Another Business teacher, Rose, was also confident about teaching Computing in the Modern World, the only CS course she was teaching. In particular, Rose was comfortable with her school not offering more programming courses for students interested in CS. She believed that other Business courses can meet students' need instead.

[Rose]: "I think that most of our students, who have been interested in [CS] and have asked about it, truly do have a desire to learn [CS]. They were really disappointed that we're not offering it... They truly want it, and I think they've settled for Business classes... I think as an overall department, they flow well together, because there is some interrelated stuff... Some students who want to go into programming might want to own their own business. So, Business Essentials would be great for them, because it teaches them entrepreneurship and the skills behind the scenes that they may need to start their own business."

4.1.4 Summary of Self-Identity by Teachers

The above sections presented how the participants self-identified themselves as teachers in different subjects. Overall, these teachers all taught more or less some form of CS, but they were different in terms of their confidence and commitment, and their sense of the need for learning and CS teacher community.

4.2 Influencing Factors

This section presents how teachers explained their own perceptions as a CS teacher or teacher in another subject. Overall, four kinds of factors contributed to these teachers' self-identity related to their teaching in CS (with at least two teachers reported similarly): their educational background and certification, CS curriculum and department hierarchy, availability of CS teacher community, and teachers' perceptions about the field of CS.

4.2.1 Educational Background and Certification

First of all, these teachers relied on their own educational background to identify themselves as teachers in a specific subject. For example, Bob identified himself as a CS teacher with his computing background. In contrast, Rose saw herself as a Business teacher since her major was Business Education.

[Rose]: "Well, I identify myself more as Business Education [teacher]. I teach Accounting, also. I've taught

Computer Applications and Programming. So, really my degree is not in [CS]. It's in Business Education. So, that's just my identity."

Beyond self-identification, teachers' personal educational background could also influence specific aspects of their identity and likely their teaching practices as well. As presented in Section 4.1.2, Cindy felt more comfortable with teaching Math. She felt she could "get a good handle on Math" since she was more familiar with Math. She also saw CS as part of Math and used Math problems in her programming courses. Moreover, she would like to continue teaching Math even if she enjoyed teaching CS.

Similarly to educational background, teachers used the certificate(s) they held as one kind of criteria for self-identification. For example, both May and Rose believed that they were Business teacher since that was what they were certified for.

Certificates also determine the path teachers came into CS teaching, which also influenced how other entities (e.g., the local county and local school) identified the teacher in related subjects. For example, Bob was seen as an Engineering teacher due to his first certificate in Technology Education, which determined the courses assigned to him and his professional development requirements. In fact, Bob was always interested in teaching CS. He was confused with which certificate would allow him to teach CS courses and thus experienced a devious path to CS teaching.

[Bob]: "I had my Technology Education certification first... I originally thought Technology Education would encompass the Computer classes. It wasn't until I got into the school system that I found out that [CS] was under Business... [I then did the Business Education certificate] because I wanted to teach the [CS] classes."

Similar to Bob, since there was no specific certificate for CS teachers, John got a Math Education certificate as the route to teaching CS. He had started teaching Math before he was able to teach CS. He was still seen as a Math teacher by his students since he worked in the Math department and his classroom was also physically located on the Math hall.

4.2.2 CS Curriculum and Department Hierarchy

Participants also reported that CS curriculum and department hierarchy influenced their identity related to CS teaching. Here, CS curriculum and department hierarchy refer to what courses are offered under which part of the secondary curriculum and thereby under which department/academic unit. In Georgia, CS courses were offered under the same unit (Business and CS program under the CTAE department). These courses were electives. Such situation could prevent students, administrators as well as teachers seeing the values of these courses. Meanwhile, by putting CS under Business, some Business teachers who were not interested in teaching these technical courses had to teach these courses. These teachers likely did not value what they were teaching and were not motivated to teach these courses. As we will discuss in the next section, this situation can also hurt the sense of community of those isolated but more motivated CS teachers.

4.2.3 Availability of CS Teacher Community

As we can see from section 4.1, most of these teachers expressed a sense of need to learn to teach CS better, including all the four CS teachers and the three mixed subject teachers listed above. As usually there were no other CS teachers in their local schools, these teachers were isolated. The lack of peers and community did

not only prevent learning opportunities among CS teachers, but also hurt these teachers' feelings about themselves. They felt that they did not have peers or colleagues like themselves at their schools. As presented above, Pat was complaining that teachers who did not care about CS hurt the whole community of CS teachers. Cindy was looking for teachers with similar mindsets for collaboration, who did not see CS as computer applications and did not teach programming like teaching applications.

In addition to the sense of belonging/affiliation, the lack of community/peers also influenced other aspects of teacher identity. As presented above, John felt he was a better Math teacher than a CS teacher due to the lack of support from peer CS teachers.

4.2.4 Teachers' Perceptions of the Subject (CS)

The participants also held different perceptions about the field of CS and CS education. These perceptions influenced specific aspects of their teacher identity in CS teaching, such as their beliefs in the values of CS, their confidence in teaching CS, the need for learning and CS teacher communities.

First, they had different definitions about computing and CS. Most teachers saw the values of CS for students and broadly defined CS or computing as problem-solving using computers. However, the two Business teachers saw learning computing as learning about operating computers. So, they recognized the values of learning 'computing' for every student. Meanwhile, they narrowly defined CS as being only about programming and was only for smart students.

Secondly, some teachers were concerned about the rapidly changing nature of the CS field. That influenced how they felt about teaching CS and the need for continual learning. As presented above, Becky perceived that CS was hard to teach. She clearly saw the need for updating her own knowledge and skills. Similarly, Ryan and Cindy also understood that CS was an evolving and broad field, and felt they needed to learn with peer CS teachers. In contrast, the two Business teachers (May and Rose) were confident in their current teaching and did not indicate a strong sense of need for continual learning.

5. SUMMARY AND DISCUSSION

5.1 Summary of Findings

This study is a first step to look at how current HS CS teachers identified themselves and felt about their teaching in CS. From this study, we have found that these CS teachers held different teacher identities with varied features related to their motivation and commitment in teaching CS. Some of these teachers were not committed to teaching CS, or not confident. Some held narrow views about CS and therefore its values. They were all isolated and most of them were looking for learning opportunities and communities specifically for CS teachers.

Results from this study indicate four factors influencing these teachers' perceptions about their identity related to CS teaching: teachers' educational background and certification, CS curriculum and department hierarchy, availability of CS teacher community, and teachers' perceptions about the field of CS. These four aspects are not individual factors and can interact with each other.

First, it is natural for a teacher to pursue a certificate in his/her own major. We can see an overall match between teachers' educational background and the certificate (s) they hold. Second, the structural aspect of secondary CS education determines the

academic nature of CS (curriculum). In Georgia, CS is under Business. Teachers usually need a Business Education certificate to teach CS. Such an administrative context can cause other issues for CS education. For example, CS courses as electives can hurt the value of CS and lose student interest. This can then lead to fewer students, fewer CS courses offered, and fewer CS teachers needed. Such ripple effect can cause the isolation of CS teachers. Third, teachers' perceptions about CS influence their sense of the need for learning and what kind of community they want to join. With different understandings about things like what is CS, who should learn CS, what are the goals of CS courses, they can form different opinions about themselves and who count as their peers.

5.2 Implications for CS Teacher Professional Development

The findings from this study suggest a need for helping current HS teachers build a sense of professional identity as a CS teacher, in order to sustain and foster these teachers as committed, quality CS teachers. This is not a unique need for preparing CS teachers. As Alsup [1] concluded in her book, *Teacher Identity Discourses*, "Beginning teachers need a teacher education that provides them with opportunities to develop satisfying professional identities, so that they can live and work in challenging institutional environments." As we discussed earlier, the unique challenges for CS teacher professional development are tightly linked with the evolving, young nature of the computing field and the structural context for computing education. As computing educators, we need to recognize and work on how to address these challenges.

It is obvious that the structural aspects of CS education under the current educational system, such as curriculum standards and certificate requirements, are critical in determining other aspects of CS education including our CS teachers' knowledge, motivation, commitment as well as their teaching practices. However, it is hard to change those aspects. Meanwhile, our findings also indicate that many CS teachers are isolated and lack of support and learning opportunities while they feel the need for learning. Therefore, it can be one way to offer support for those existing CS teachers and influence their own sense of identity by creating a community of local CS teachers where they can learn and support each other and change their perceptions of CS, CS teaching and themselves as a (CS) teacher.

5.3 Future Work

After gaining an initial understanding of HS CS teachers' identity and potential influencing factors, we are currently conducting a study exploring how to support CS teachers' identity development, through a professional development program with a focus on promoting teacher learning and community building. We are expecting to further our understanding of ways to change teachers' identity into more committed CS teachers.

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