Experiences in Delivering Online CS Teacher Professional Development

Jina Wilde
University of Texas at San Antonio
San Antonio, TX, USA
jina.wilde@utsa.edu

Emiliano Beltran
University of Texas at San Antonio
San Antonio, TX, USA
emiliano.beltran@utsa.edu

Michael J. Zawatski
University of Texas at San Antonio
San Antonio, TX, USA
michael.zawatski@utsa.edu

Amanda S. Fernandez
University of Texas at San Antonio
San Antonio, TX, USA
amanda.fernandez@utsa.edu

Priya V. Prasad
University of Texas at San Antonio
San Antonio, TX, USA
priya.prasad@utsa.edu

Timothy T. Yuen
University of Texas at San Antonio
San Antonio, TX, USA
timothy.yuen@utsa.edu

ABSTRACT

This paper describes our team's experience in designing and delivering the online teacher professional development (PD) program, Computer Science for San Antonio (CS4SA), aimed at empowering educators with computer science (CS) knowledge to increase Latinx participation in CS and STEM education within a large, urban predominantly Latinx school district in South Texas. This paper highlights the successes, challenges, and lessons learned while facilitating two cohorts of the CS PD through online platforms during the COVID-19 pandemic. As a result of this program, participants recognized the importance of integrating CS into their classroom and becoming advocates for the discipline at the high school level. Additionally, teachers, investigators, and other personnel learned important lessons for enhancing the program's impact through collaboration with district administrators and refinement of the online learning experience.

CCS CONCEPTS

• **Social and professional topics** → **K-12 education**; **Computer science education**; • **Applied computing** → **Distance learning**.

KEYWORDS

CS Teacher Professional Development; Computer Science Education; Online Learning; Latinx Participation

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1 INTRODUCTION

Computer Science for San Antonio (CS4SA) is a teacher professional development (PD) program designed to equip a diverse group of STEM educators in a large, urban, predominantly Latinx school district in South Texas with computer science (CS) knowledge, enabling them to introduce CS experiences into their classrooms and increase Latinx participation in CS. CS4SA presents computer science and pedagogy that aligns with the state's high school CS teacher standards, assists teachers with navigating the challenges of implementing CS teaching in the classroom, and guides them in designing CS curricula and experiences for their diverse classrooms [4]. The program prepares teachers to teach CS effectively (e.g., courses like AP Computer Science A), advocate for CS education, and assume leadership roles, addressing the underrepresentation of Latinx students in CS and STEM degree programs [16].

In recent years, the district's declining enrollment, exacerbated by STEM-focused charter schools, affordable housing issues, and the need for school renovations, has led to the proposal of closing nineteen out of ninety-three campuses [5, 8]. Our program has faced recruitment challenges, partly due to these external factors. Nonetheless, the transition from an entirely in-person PD to an online format prompted by the COVID-19 pandemic allowed for broader outreach and accessibility, making it particularly valuable for CS coordinators, CS teachers, and project leaders seeking to prepare secondary teachers using online resources. Additionally, the program incorporated several innovative features, such as an engaging Summer Institute (see Section 5), and a collaborative partnership with a non-profit organization, Youth Code Jam (see Section 5.1), which will be detailed further in this report.

The shift to an online format brought about a unique set of challenges in delivering teacher PD online in both synchronous and asynchronous modalities. As the pandemic situation has evolved, our team has incorporated more hybrid and in-person activities for teachers, which also brought new challenges to the program. This paper presents an overview of the CS4SA professional development program, its transition to an online and later hybrid design, and highlights both its successes and challenges, as well as the key takeaways of this program.

2 RELATED WORK

2.1 Effective PD Elements

Darling-Hammond et al. [12] conducted a review that established a positive link between teacher professional development and improved teaching practices. The authors identified seven elements

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of effective professional development: active engagement, effective practice models, sustained duration, content-focused learning, reflection, and feedback time, coaching and expert support, and teacher collaboration. The program primarily incorporated the latter four elements by fostering a sense of community among teacher participants. This community facilitated mutual support in comprehending module content, reflecting on their teaching styles, and was enhanced by several feedback sessions led by program instructors.

2.2 Online PD Features

Additionally, Power and Obdur et al. [18] identified six essential features for designing and implementing online teacher professional development. The CS4SA program incorporated these elements (listed next) in the following ways: (1) relevancy-periodic updates of prevalent CS content, (2) usefulness-applications of learned content to implement CS in schools, (3) interaction and collaboration-creation of a teacher community, (4) authentic tasks and activities (explained further in Section 5.1), (5) reflection and (6) context, the intersectionality of technology, content, pedagogy, and learners-addressed through discussions held during the Summer Institute and monthly workshops (more details in Section 5).

2.3 Supporting Literature

Our experiences in constructing a CS professional development (PD) program are paralleled in recent literature in multiple ways.

First, online PD is valuable. Parsons et al. [17] discovered that nearly 80% of the participants had prior experience with online PD and found it valuable; nearly half believed they could largely apply what they learned. Lee, Fanscali, and Clough [14] assert that teachers are better armed to implement and reform their schools with the knowledge gained from PD participation.

Second, teachers need time and support for PD efforts to take root. Meneske [15] found that teachers lacked sufficient PD time and support to implement CS practices in the classroom and were unprepared to teach CS subjects due to inadequate integration of CS pedagogical knowledge with CS PD content. In a similar fashion, Lee, Fanscali, and Clough [14] acknowledged the stark challenges of widening a district-wide CS education program due to poor implementation planning, lack of shared CS vision, and meager administrative support at the district level.

Third, teachers varied in their CS experience and teaching. Qian et al. [19] identified that these differing levels affected their application of and participation in the PD.

Fourth, teachers' motivation for PD eclipses compulsory requirements for PD. In the context of adult learning, learners are driven by meaningful experiences that align with their own goals and interests [13]. In the case of this program, participants were interested in becoming CS teachers as part of their professional development, which could be integrated into their practices, while also invested in creating more CS/STEM experiences for their students. When participation in PD was voluntary, participants' sentiments were positively affected concerning online PD when compared with involuntary participation. Likewise, participants found little appeal regarding online PD formats involving participation badges, gamification, and scavenger hunts [17].

3 PROFESSIONAL DEVELOPMENT OVERVIEW

CS4SA is a Researcher-Practitioner Partnership (RPP) established between a large Texas public university and a large local public school district. The school district's current demographic data indicates that 79% of students identify as Hispanic or Latinx, 13% as White, 6% as Black or African American, 1% as Asian, and 1% as two or more races [1]. The program's primary focus is to engage teachers in grades 8-12. The collaborative effort involves the CS4SA university team and the district administration working together to recruit teachers for this CS professional development program. The CS4SA team consists of a transdisciplinary group of faculty and students with expertise spanning CS, STEM Education and Outreach, teacher education, and instructional design, ensuring a comprehensive approach to the program's objectives [4].

3.1 Program Design

CS4SA offers comprehensive instructional materials, including books on computer programming and culturally responsive pedagogy, and access to online professional development resources. The program starts with a three-week Summer Institute, featuring online modules on CS and culturally responsive pedagogy. Most of the foundational Java programming knowledge is provided during the Summer Institute. After the Summer Institute, the CS4SA program continues with six monthly workshops that incorporate mentoring from previous teacher participants (more details in Section 4.5).

These workshops continued with additional computing topics that CS teachers need to know for their certification exam. As a culmination of the program, participating teachers are required to take the CS teacher certification exam and submit their results. To support their professional growth, participants are fully reimbursed for the test fee. Upon successfully completing the entire program, teachers are rewarded with a stipend as an acknowledgment of their dedication and commitment. Moreover, they earned 240 hours of continuing professional education credits in recognition of their ongoing learning and development.

3.2 Course Content

CS4SA has a primary goal of preparing in-service teachers to become certified Computer Science 8-12 educators. The course content consists of fourteen modules, each aligned with the CS teacher certification standards in the state of Texas. The topics covered during the Summer Institute include:

(1) Computer Science for Diverse Learner Populations
(2) Fundamentals of Programming in Java
(3) Object-Oriented Programming
(4) Data Structures

After the Summer Institute, the topics covered include:

(1) Algorithms
(2) Software Engineering Practices
(3) Digital Forensics
(4) Discrete Mathematics
(5) Technology Applications
(6) Making and Microcontrollers
(7) Educational Robotics
(8) Game Development with Unity and C#

(9) Mobile Application Development

3.3 Online Modules

CS4SA course materials are hosted through the Moodle Learning Management System (LMS) [7]. Our team created and maintained the course modules to ensure relevance and alignment with the latest developments in the field of Computer Science education. These modules provided the bulk of the program's content and were designed for the teachers to complete asynchronously. Later iterations of the Summer Institute have also been presented as part of in-person presentations.

The course materials encompass various components, such as readings, short videos, Java programming exercises using BlueJ [3] software, robotics, mobile application programming with App Inventor [2], discussion board interactions, end-of-lesson quizzes, end-of-module quizzes, and practice tests. The creation of the modules involved collaborative efforts between university CS and education faculty, and student research assistants, over approximately one year, from August 2019 to December 2020.

3.3.1 Integration with Moodle and Adobe Captivate. CS4SA utilized Moodle as its LMS to deliver documentation and course content. The course content is created as slides and then transferred into Adobe Captivate, an authoring tool that facilitates the creation of interactive eLearning content and learner tracking [10] which were then uploaded onto Moodle.

3.3.2 Moodle Administrative Capabilities. With Moodle, administrators can manage a list of learners and instructors, assign distinct roles, configure course settings (e.g., controlling progression based on completion of preceding activities), and track analytics such as activity completion time, scores, test records, and more [10].

3.3.3 Technical Requirements. It is important to note that Moodle, like any LMS, has certain technical requirements that may require expertise in setting up a hosting server and creating backups. Additionally, both Moodle and Adobe Captivate involve fees.

3.4 Course Materials, Documentation, and Online Sharing

In addition to the online modules, teachers are provided with several books that cover Java programming and culturally responsive pedagogy, which complements the CS content. There were several discussion activities throughout the Summer Institute based on the readings on culturally responsive pedagogy.

An additional benefit for teachers is the opportunity to retain the instructional materials they utilized during the program, including books, robotics kits, and microcontroller kits. This resource provision enables teachers to continue incorporating innovative teaching techniques in their classrooms.

Workshop notes, discussions, and valuable resources such as document sharing, discussion boards, assignment help, support/exercise examples, and instructions, are documented on slides and shared with the participants through the LMS. This comprehensive documentation serves as an essential reference, offering easy access for teachers to reinforce their learning and implement innovative teaching techniques in their classrooms. The online platform enhances accessibility and convenience for all participants. Additionally, the LMS facilitates effective communication through announcements and occasional chat messaging, while documents can also be shared via email to further promote collaborative and engaging interactions among teachers.

4 COURSE ACTIVITIES

4.1 Coding Projects and Interactive Online Learning

Teachers actively engaged in various coding exercises and projects throughout the course to reinforce programming concepts, deepening their practical application of CS knowledge. Completed work is submitted for review through Moodle, which allows the project team to monitor progress and provide guidance. Ongoing support is available through the module discussion board, where questions and concerns can be addressed.

The course includes specific modules like "Making and Microcontrollers," "Educational Robotics," "Game Development with Unity and C#," and "Mobile Application Development." These modules focus on reinforcing CS concepts through engaging activities tailored for students. While not directly aimed at test preparation, they inspire teachers to explore other CS applications for their classrooms, enhancing the learning experience for students. The modules are thoughtfully designed to go beyond the base tutorials by adding extension activities, encouraging creative exploration and application of CS concepts.

Throughout the course, teachers are encouraged to upload videos or screenshots of their completed projects, as well as post questions and concerns on the module discussion boards. These interactive elements foster a collaborative and supportive learning environment, enabling valuable interactions between participants and facilitating a richer learning experience.

4.2 Comprehensive Test Preparation and Assessment

All of the modules are aligned to CS state exam competencies. The CS4SA program offers exercises, quizzes, and practice tests to reinforce the content and format of the state CS teacher certification exam. The final module is dedicated to comprehensive test preparation and includes multiple practice tests. To accurately simulate the certification exam, teachers are encouraged to achieve high passing scores of 85%-90% on these practice tests. Moreover, participants are urged to review all course materials and retake quizzes and practice tests as needed to reinforce their understanding of the content. Assessment includes online module completion, quizzes, and practice tests. The Moodle LMS score tracking feature enables our team to analyze participants' study efforts and scores, providing valuable insights. Additionally, attendance is mandatory for both the Summer Institute and monthly workshops.

4.3 University Field Trips

In an extension of the program, CS4SA provides opportunities and organizes field trips for participating teachers, enabling them to bring students to the university. These experiences provide students with firsthand exposure to the campus environment and valuable insights into diverse STEM degree programs.

4.4 Research Interviews and Feedback Collection

Research interviews with participating teachers are conducted at the beginning, middle, and end of the program to track progress and capture their perspectives on integrating CS in their classrooms. These interviews are facilitated remotely using common teleconference tools like Zoom, allowing for convenience and flexibility.

4.5 Mentoring

To foster a collaborative learning environment, teachers who complete the CS4SA program are invited to return as mentors in the subsequent year and receive a stipend, regardless of their certification outcomes. Their insights and experiences provide valuable guidance to new participants, enriching the overall program experience.

5 SUMMER INSTITUTE

CS4SA commences with a three-week intensive program focused on culturally responsive pedagogy and computer science, with an emphasis on Java programming. Initially conducted fully online due to the pandemic, the program had evolved over time to include both in-person and online workshops of the professional development (PD) materials. These workshops are facilitated on the university campus and led by the team's university faculty and student assistants.

One of the weeks during the Summer Institute features a summer programming camp, led by experienced instructors from Youth Code Jam. This camp is open to rising middle and high school students and provides them with an opportunity to explore and engage in introductory coding activities (more details available in Section 5.1). The other two weeks are dedicated to collaborative learning, where teachers engage with the first several modules on CS and culturally responsive pedagogy.

5.1 Youth Code Jam Collaboration

As a component of the Summer Institute, CS4SA partners with Youth Code Jam (YCJ), a non-profit organization providing coding experiences to youth across Texas [11]. In preparation for the Summer Institute, we collaborated with the school district administration to support student recruitment for the YCJ summer camp on the university campus, with the aim of engaging a diverse group of students and generating interest in computer science. During the second week of the Summer Institute, YCJ conducted a beginner-level blocks coding camp for middle and high school students led by their instructors. CS4SA teachers actively observed and engaged in this camp, gaining valuable insights into best practices for coding education and creating a dynamic learning environment.

5.1.1 Cohort 1 YCJ Camp (July 2021). This camp was divided into morning and afternoon sessions. Cohort 1 successfully recruited approximately twenty high school students for the Youth Code Jam programming camp in the morning session. The first half of the teachers actively assisted and observed the virtual camp from their classrooms, enhancing their learning experience. However, the afternoon session had no student sign-ups, leading the second half of teachers to engage in the camp with Youth Code Jam instructors.

5.1.2 Cohort 2 YCJ Camp (July 2022). Cohort 2 faced challenges in student participation despite the district administration's efforts to support recruitment. There were communication issues between parents and students who were not aware they had been signed up. Consequently, only two high school students attended the morning session, and one student attended the afternoon session. To address these challenges, the program organizers planned to offer only morning sessions for Cohort 3.

5.1.3 Cohort 3 YCJ Camp (June 2023). Cohort 3 encountered similar obstacles in student enrollment initially but saw an increase to approximately twenty students throughout the week, thanks to dedicated district administration efforts. CS4SA provided a classroom set of micro:bits [6] which students were allowed to keep at the end of the camp, further inspiring coding applications.

For all cohorts, a professor from our team delivered a presentation on university computer science degree programs and STEM degrees, inspiring students and promoting career awareness in the field. Teacher participants found the presentation informative, enriching their collaborative learning experience.

6 MONTHLY WORKSHOPS

The monthly workshops following the Summer Institute play a crucial role in the CS4SA program, extending the learning throughout the year. Held between September and May, these workshops offer valuable opportunities for teacher participants to enhance their CS knowledge, improve instructional abilities, and review the course modules in preparation for the certification test.

6.1 Virtual Workshops - Cohort 1

Cohort 1 workshops were held virtually once a month, lasting approximately two hours each. Optional virtual tutoring for additional CS support had low attendance. Despite this, the virtual format of the workshops provided connectivity and ongoing support during the initial stages of the program.

6.2 Hybrid Workshops - Cohorts 2-3

To address the need for more in-depth learning experiences and accommodate participant preferences, Cohorts 2 and 3 transitioned to in-person workshops held on the university campus. Each workshop lasts approximately six hours, providing the opportunity for teachers to delve deeper into CS content study and actively participate in hands-on programming exercises. The collaborative and supportive environment allows teachers to openly discuss experiences, share updates, and address challenges in CS education implementation.

It is important to highlight that while the workshops are held in person to facilitate direct interactions, the course content and resources are sourced from the online modules. The blend of in-person engagement and online content delivery enriches the learning experience and empowers teachers to effectively integrate CS education into their classrooms.

7 OUTCOMES

This section focuses on CS4SA's outcomes, particularly regarding teacher participation and instructional design. We will discuss the

successes and challenges experienced by two cohorts using different modalities and how these experiences influenced program enhancements. Interview data from our primary research activities support various outcomes related to teacher participants.

The online format and LMS presented challenges but also provided important advantages such as broader outreach, flexibility, and enhanced accessibility. The LMS streamlined participant progress tracking and communication. However, limited district administration support, driven by pressures from state testing and other academic priorities, alongside compensation structures disincentivizing STEM teachers from pursuing CS teaching roles, posed additional obstacles in establishing and sustaining robust CS curricula and programs. These challenges guide our ongoing efforts to refine the program for the future.

7.1 Recruitment Challenges and Program Outcomes

Initially designed to recruit non-CS high school teachers, the enrollment of teachers in CS4SA declined unexpectedly over the course of the cohorts, attributed to a lack of interest. This decline in enrollment may be further influenced by external factors, including the emergence of STEM-focused charter schools that have drawn students away from public schools, and a general trend of declining enrollment within the district in recent years, which has led to the school board recommending the closure of nineteen out of ninety-three campuses [5, 8]. To address these challenges, middle school teachers were included in the program. Despite district promotion through workshops, emails, and flyers, the level of interest remained surprisingly low, possibly due to the program's restriction to one school district.

Nevertheless, CS4SA attracted diverse educators from various academic backgrounds, including math, science, business, engineering, digital art, and information technology, in addition to a high school librarian. Many of the teachers shared racial, ethnic, and cultural backgrounds with their students, enhancing the potential for relatable and culturally responsive CS education. The program ultimately aims to allow students to explore CS topics aligned with their interests and cultural backgrounds, facilitated by teachers who are diverse and representative of different cultural backgrounds.

7.1.1 Pilot Phase (August 2020 to July 2021). During the pilot phase, known as CS4SA-NOW, half of the modules were covered. Originally designed as an in-person program, the pilot phase underwent adjustments due to the pandemic. Fifteen teachers initially joined the program, but ultimately, only three teachers completed it and progressed to Cohort 1.

7.1.2 Cohort 1 (July 2021 to June 2022). Cohort 1 started with twelve participants, of whom eight successfully completed the full course. Among the participants was a CS-certified teacher who was hired by the district as a math teacher. His interest in joining CS4SA was to advocate for integrating CS curriculum into the coursework and seek support. Among the eight participants who successfully completed the program, one teacher successfully passed the CS Teacher Certification exam.

This cohort faced the largest disruption to their classrooms due to the pandemic, with many of their students working remotely. At the end of the year, Cohort 1 was asked to create videos to share their feedback to the district about the necessary support to successfully implement CS in their classrooms. Unfortunately, the administration did not implement any notable changes in response to these videos, and the reasons for this decision remain unknown.

7.1.3 Cohort 2 (July 2022 to July 2023). Cohort 2 began with four teacher participants, one of whom has completed the course, while another is still working towards completion. The other two teachers completed the Summer Institute but did not proceed with the program further. To address recruitment challenges, teachers from Cohort 1 were invited to join as mentors. Despite only one Cohort 1 teacher achieving certification, these mentors shared their valuable experiences and challenges with Cohort 2. Cohort 2 saw most of their students return to traditional classroom settings, although some students attended in a hybrid fashion due to illness. Cohort 2 also experienced more pressure to focus on improving state test scores.

7.1.4 Cohort 3 (June 2023 to Ongoing). Cohort 3, which commenced in June 2023, also faced recruitment challenges. At present, two teacher participants have started the CS4SA program and successfully completed the Summer Institute. Additionally, to accommodate scheduling conflicts and attract more teachers, one more educator has been recruited to participate in an asynchronous version of the Summer Institute. As part of this modified format, the Youth Code Jam programming camp was excluded to ensure greater flexibility for participants. However, all teachers will be required to attend the monthly workshops together.

7.1.5 Data Collection and Review. Data from Cohort 2 and Cohort 3 in the form of interviews, surveys, and periodic workshop discussions is currently being collected and reviewed to understand how teachers have integrated CS into their courses or clubs.

7.2 Certification Exam's Impact on CS Teaching Identity

After completing the program, teachers acknowledged the significance of passing the certification exam to identify as CS teachers. In Cohort 1, only one teacher successfully passed the state CS teacher certification exam, and results for Cohort 2 are pending. Despite the challenges faced by many in the certification process, all participants found significant value in the CS4SA program. Many expressed strong interest in creating more CS and STEM experiences in their classrooms.

While the results from Cohort 2 are still pending, it is evident that the certification exam presented challenges for many teachers. However, despite the majority of teachers not passing the test, all participants reported finding significant value in the CS4SA program and several reported continued interest in creating more CS and STEM experiences in their classrooms.

7.3 Successful Program Takeaways

Despite the challenges faced, CS4SA achieved several successful takeaways. Teacher participants found value in the program by learning more about CS and embracing culturally responsive pedagogy. Teacher participants reported transforming their own teaching to better serve their students, with one participant specifically

sharing how they learned to listen more attentively to students' opinions which led to establishing a stronger connection with them.

Furthermore, CS4SA fostered a sense of community among teacher participants, even in the online environment. Through virtual interactions, educators established connections with their peers, discovering valuable information about other schools and STEM opportunities for students. This networking aspect proved crucial in exposing them to new ideas and practices they could potentially implement in their own classrooms.

Teacher participants also acknowledged the importance of exposing their students to CS professionals. For instance, one teacher invited an industry Software Developer to discuss his involvement in developing a company's mobile app. The teacher observed that students easily related to his work, as it involved everyday applications, making CS more relatable and relevant to their lives.

Furthermore, incorporating engaging lessons, similar to those in CS4SA, which involve robotic kits and coding projects utilizing Unity [9], C#, and Java, has proven to be instrumental in igniting students' interest in CS. Despite the challenge posed by limited time within the academic year, teachers' efforts to introduce CS activities have motivated students to explore the subject further outside of the curriculum. Some teachers established after-school clubs to introduce CS and related activities, while others capitalized on available free time at the end of the school year for CS-related endeavors. Although student recruitment posed its own challenges, those who actively participated in the activities gained invaluable exposure to CS concepts. Many teachers leveraged the program's resources as guides for student activities, encompassing a range of projects from Unity-based game development to robotics and Scratch block coding. This collaborative learning approach, where teachers learn alongside their students, has cultivated a stronger sense of engagement and connection among participants.

7.4 Technical Challenges

7.4.1 Challenges in Maintaining the Moodle Course. During the transition from Cohorts 2 to 3, CS4SA encountered unforeseen issues while attempting to copy the course, resulting in the unintentional loss of critical course data and content from the pilot CS4SA-NOW and Cohorts 1 and 2 courses from the Moodle platform. Despite seeking assistance from Moodle's technical support, the content could not be restored, necessitating the recreation of the entire course.

7.4.2 Addressing Different Timelines. To address the different timelines of Cohort 2 and Cohort 3, a workaround was implemented by assigning teachers different roles within the same course rather than creating separate courses as done previously. This adjustment allowed all participants to access the course together despite their varied schedules and roles.

7.4.3 Importance of Technical Expertise and Support. The use of Moodle and Adobe Captivate requires vigilance with technical aspects, as unexpected challenges can arise. Having the necessary expertise and support is crucial to ensuring a smooth learning experience for all participants in CS4SA.

7.5 Lessons Learned from Program Challenges

7.5.1 User-Friendliness of the LMS and Teacher Feedback. Teacher feedback revealed challenges with the Moodle LMS, citing its lack of user-friendliness and limited screen space that hindered working on course projects. The slides, in particular, could be hard to read and navigate during review. Additionally, teachers expressed that the lack of support from the district in modifying curricula and schedules to accommodate CS education, combined with the pressures of state testing, affected their full engagement in the program. Consequently, some teachers lacked motivation to pass the certification exam, leading to overall low study efforts.

7.5.2 Impact of Predominantly Online Sessions - Cohort 1. Cohort 1's predominantly online sessions left participants desiring in-person workshops for better content comprehension. Although changes were implemented for Cohorts 2 and 3, completion outcomes did not significantly improve. Our team is still awaiting program completion and test results for Cohort 2, while Cohort 3 has just begun the program.

7.5.3 LMS Technical Challenges. The LMS posed hosting-side technical challenges when a substantial portion of the program's content was inadvertently deleted without any backups. The team invested considerable time and effort to recreate the content, but the hosting company did not provide any explanation for the incident or the malfunctioning backups. As a result, the issue is being closely monitored to prevent such incidents in the future.

8 CONCLUSION AND FUTURE WORK

CS4SA remains steadfast in its mission to promote diversity in CS and STEM education, with teacher participants emphasizing the importance of integrating CS into their classrooms. Future work involves enhancing the online learning experience based on teacher feedback to ensure its relevance and engagement for students. The program has provided valuable insights into the district's CS education conditions and teacher perspectives, while recruitment challenges have offered insights to refine strategies and broaden outreach. As we continue with Cohort 3 and beyond, we aim to bridge educators to diverse CS career options.

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