

Equity-based CS Case Study: An Approach to Exploring White Teachers' Conceptions of Race and Racism in a Professional Development Setting

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Here, we present the results of a study of in-service teachers' responses to equity-based case study vignettes focused on racialized classroom incidents. This study was conducted in the context of an ongoing research practice partnership aimed at integrating computer science concepts in elementary grades. Our work took place in a public school district that enrolls primarily students of color, while largely employing White teachers and administrators. Using a racial literacy framework [Guinier 2004], we conceptualized a continuum and developed codes to analyze teachers' responses from racially liberal to racially literate. Our results describe a range of positions across the continuum, including those consistent with the racial liberalism viewpoint that expresses individualistic views of meritocracy and colorblindness that sometimes supports a deficit view of students, those that reside in the middle who validate equity work through minimal acknowledgment yet find ways to resist further engagement with race or equity, and those who express views consistent with racial literacy practices including student-centered perspectives, asset-orientations, and the willingness to engage race directly. Further, our results indicate that teachers may express contradictory views or views across the continuum. These findings point to the developmental nature of racial literacy and the difficulty of unlearning racist mindsets. We discuss the efficacy of our case study design: anonymized, locally derived vignettes, and our case study learning activity design: written reflections, small group dialogues, and whole group share-outs in supporting teacher reflection and learning. Finally, we demonstrate the special leadership role of teachers who are moving toward racial literacy.

CCS Concepts: • **Social and professional topics;**

Additional Key Words and Phrases: Equity, race, teacher professional development, K12 CS for All

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1 INTRODUCTION

While, in the United States, computer science education has been a focus of educational research since the early 1980s (e.g., Papert [1980]), in the past decade it has become a strong national focus under the umbrella term of **Computer Science for All (CS for All)** [Smith 2016]. In this time, the CS for All educational movement has focused on the creation of a secondary level CS curriculum and CS professional development aimed at in-service secondary teachers [Cuny 2012]. An important goal of this work has been to broaden participation in CS and include more girls/women and people of color in the field [Santo et al. 2019]. To support this effort, specific curricula and professional development have focused on issues of equity in their design and implementation, most notably the **Exploring Computer Science (ECS)** curriculum developed by colleagues at the University of California, Los Angeles. This curriculum was developed in response to the disparities in CS education reported by Margolis, Estrella, Goode, Jellison, Holme, & Nao [2008] in their book *Stuck in the Shallow End*. More recently, the focus of the CS for All movement has begun to include the development of curriculum and professional development for elementary school teachers and students [Cuny 2016; Yadav et al. 2018]. To support the CS for All goal of broadening participation, efforts at the younger grades must also have a focus on equity in both curriculum development and professional development for teachers.

2 EQUITY-BASED, CS PROFESSIONAL DEVELOPMENT

In this article, we take up questions related to equity-based, CS professional development for in-service teachers at the elementary level. Our work is situated in an ongoing research practice partnership between an urban school district in western Massachusetts and a local research university. The students and families in the district are primarily people of color, whereas the elementary school teaching corps is primarily White females. This configuration is not atypical in the US; indeed, in 2016, 80% of US teachers were White and 49% of US students were people of color [National Center for Educational Statistics 2019]. While recruitment and retention of teachers of color is an important policy goal for districts and states to pursue, moving towards equity today requires in-service White teachers to take anti-racist action [Hammond 2015; Kendi 2019]. And, to do this, teachers need to engage in equity-based professional learning [Carter Andrews & Richmond 2019].

2.1 Defining Race

We ascribe to a socio-political view on the definition of race. In other words, we agree with Kendi [2016] that the notion of race was developed in Imperial Europe to serve capitalist goals; to justify the enslavement of West Africans as a means of developing vast wealth for European monarchies and their colonies through the triangular trade route created in the 16th century, C.E. In developing a racial hierarchy that placed White Europeans at the top and Black Africans at the bottom, false grounds were laid for a continual development of the mythology of the racial hierarchy. The extreme wealth developed through the triangular trade served as deep motivation for continual development of the racial hierarchy mythology.

In the British Colonies in North America, differential laws were put into place to enforce the racial hierarchy. These laws were crafted in response to Bacon's rebellion (1675–1676) in which White European indentured servants and enslaved Black Africans found common cause and worked in solidarity against the colonial governor of Virginia, William Berkeley. These new laws created harsher treatment for enslaved Africans who joined in the rebellion than the European indentured servants who did so. The goal of the differential laws was to divide the class alliance in favor of a race alliance. The new race alliance was then reinforced culturally with continual

positioning of enslaved Africans as inferior and the elevation of indentured Europeans as superior not just through laws but through financial opportunities, religious biblical interpretations, and increasingly vicious treatment of Africans in public, such that dignity was stripped from them [Kendi 2016].

The racial hierarchy mythology was further served by the Western enlightenment view of individualism, which seeks to ascribe all personal circumstances in society to the characteristics, traits, and behaviors of the individual [Nisbett 2014]. The individualistic view of societal circumstances positioned enslaved Africans as responsible for their predicament. This cultural view of race hierarchy, born of the socio-political roots of imperial European capitalism, persists today and is manifest in both implicitly held biases and meritocratic notions of individual worth.

In terms of computer science education, we see these cultural notions play out in a couple of different ways. First, recent survey research indicates that parents and administrators see computer science as an activity of interest to boys [Wang et al. 2017] and research shows mostly engaged in by White and Asian men [Zweben and Bizot 2020]. Images of who does computer science are reinforced in the media as the majority of depictions of computer scientists in popular media feature White men [Cheryan 2013]. These cultural notions manifest societally in differential computer science learning opportunities for students in high school settings. For example, as Margolis et al. [2017] showed in their study of secondary CS education in the Los Angeles Unified School District, wealthier schools attended by primarily White students offered high-level programming courses to their students, whereas schools that served low-income Black and Latinx students were more likely to offer computer literacy courses under the guise of computer science education. Students in these courses have the opportunity to learn how to use software programs and to become facile with input devices, such as keyboards, but they are not learning the basics of computer science. We argue that these differential learning opportunities are born of implicitly held White supremacist beliefs internalized by Whites through participation in US society that result in rigid structures that are difficult to dismantle.

Our definition of race, then, begins with a socio-political view driven by imperial European capitalism, but then transformed over time into a cultural belief system that drives behaviors and justifications of continued unequal treatment. This cultural belief system is often held implicitly, such that it is difficult for those who hold such beliefs to ferret them out as false. And the belief system is supported by the strong Western enlightenment views of individualism. This cultural belief system is active today among many White Americans, including teachers [Starck et al. 2020] and impedes the goals of the CS for All movement.

2.2 A Focus on Race

Our equity-based, CS professional development work has focused primarily on race. We have taken this approach due to the vast social and economic disparities that continue to exist in US society between White citizens and Black and Latinx citizens. As Watson [2017] has noted, “Prominent social issues facing Black people during the Civil Rights era persist today; police brutality, housing discrimination, and income inequality...” Indeed, the Urban Institute [2017] has shown that the wealth gap among White families and families of color has not improved since 1963 and that White families have seven times as much wealth as Black families, and five times that of Latinx families. These disparities include involvement in the field of CS, according to the 2019 Taulbee Survey [Zweben and Bizot 2020], of the ~30,000 individuals earning bachelor’s degrees in CS in 2019, only 4.1% went to Black students, 8.7% went to Latinx students, and 44.6% went to Whites. These social and economic disparities lead to what Milner [2012] has defined as an opportunity gap for Black students in US schools. According to Milner [2012], there are several educational practices that exacerbate or help sustain the opportunity gap, which are also experienced by Latinx

students [Flores 2007]. These practices include “... (a) colorblindness, (b) cultural conflicts, (c) myth of meritocracy, (d) low expectations and deficit mindsets, and (e) context-neutral mindsets and practices” (p. 699). Ullucci and Battey [2011] contend that these practices arise from adherence to an individualistic worldview. Hammond [2015] has noted that this results in a deep culture difference (individualism vs. collectivism) between White teachers and students of color in the US, arguing that White teachers have a stronger belief in individualism, while students of color come from families and communities that have a stronger ethos of collectivism. This difference in worldview is partially responsible for educational practices that harm students of color. This is so because, as noted earlier, an individual approach to understanding others supports the notion that individuals are responsible for the circumstances of their own lives, regardless of historical and societal factors, thereby rendering invisible the struggles of oppressed groups within a society and making possible meritocratic and colorblind viewpoints [Ullucci and Battey 2011].

We also focus on race in our equity-based, CS professional development because the majority of US students of color are taught by White teachers [National Center for Educational Statistics 2019], and as Starck et al. [2020] have demonstrated, White teachers are no less free of implicit racial bias than other White US citizens. As they note, adult White US citizens, teachers and others, hold “... pro-White explicit and implicit racial biases” (p. 273). This finding is unsurprising, as Sleeter (2012) has noted, the very structure of teacher education in the US is steeped in Whiteness and, therefore, supports the perpetuation of educational practices that create the opportunity gap, even as many colleges of education aim to have a social justice orientation. The hegemony of Whiteness in colleges of education may be supported by the fact that the vast majority of faculty in colleges of education in the US are White [Davis and Fry 2019], and, therefore have their own anti-racist work to do [Galman et al. 2010]. And, while efforts to decolonize [Bang 2018; Sleeter 2010] and diversify the curriculum are certainly underway [Jennings 2008], there remain challenges, for example programs that do offer a more multicultural curriculum often do so in a limited fashion, as opposed to integrated across the curriculum [Sleeter 2012].

Arguably, to meaningfully address the effects of racism on broadening participation in CS, White teachers must work to close the opportunity gap through developing a deeper understanding of race, interrogating the role of their own implicit bias (including adhering to practices rooted in an individualistic world view such as meritocracy and colorblindness) in promulgating the opportunity gap, and striving to create anti-racist classrooms. One of the ways teachers might be able to do this work is through equity-based, CS **professional development (PD)** and participation in **professional learning communities (PLCs)**. For example, Ryoo et al. [2015] found that teachers involved in ECS PD and PLCs reported that the equity aspect of the PD had an impact on them resulting in changes to their pedagogical practices.

2.3 (Not) Talking about Race

While it is possible for PD and PLCs to support teachers in developing more equitable pedagogical practices, dealing specifically with racial issues continues to be a challenge. In their study of teachers’ discussion of race in ECS PD workshops, Goode et al. [2020] found that many teachers are not comfortable discussing race and are quick to find ways to minimize the role of systemic racism in CS education. In line with Milner’s [2012] notion of the opportunity gap, Goode et al. [2020] report that teachers have internalized a societal discourse of school as a context neutral, apolitical space and often engage in colorblind discourses that result in either a focus on the individual (as opposed to systemic oppression), evasion, and/or deflection of discussions of race [Segall and Garrett 2013].

These findings replicate earlier findings that consistently record the challenges that White teachers have in discussing race, even when unlearning racism is a clear goal of professional development [Coles-Ritchie and Smith 2017; Taylor 2017]. While some researchers have found

White teachers actively resist accepting racial disparities as an outcome of White hegemony [Picower 2009], others have found that White teachers, while desirous of developing an anti-racist stance, struggle to do so [Epstein 2019]. Difficulties that arise for White teachers in developing an anti-racist stance include false empathy [Warren and Hotchkins 2015], the pernicious persistence of deficit thinking [Boutte and Jackson 2014], and the use of personal experience to undermine understandings of complicity in supporting hegemonic Whiteness [Crowley 2019; Picower 2009; Taylor 2017].

2.4 Deficit Thinking

The persistence of deficit thinking is particularly concerning in a field like CS, which is already raced and gendered as a discipline such that it is most often pursued by White and Asian men [American Association of University Women 2010; Margolis and Fisher 2002]. Implicitly held societal views of CS as appropriate for certain people and not others can manifest in structural and interactional arrangements that result in a loss of opportunity for students of color in CS [Margolis, Estrella, Goode, Jellison, Holme, & Nao, 2008; Shah et al. 2020]. Zhou et al. [2020] report that teachers engaged in ECS professional development bring with them a mindset that places the onus for inequitable CS participation on the shoulders of individuals, as opposed to historical, systemic, and structural reasons. Taken together, these viewpoints (CS is for White and Asian men and individuals are responsible for their own participation) can lead to or reinforce pre-existing deficit views of students of color in a classroom context.

While this is the case, some studies have shown that White teachers can and do develop strong abilities to work well with students of color [Crowley 2019; Johnson 2002; Milner 2011]. In these instances, teachers can develop cultural competence and engage in the use of culturally relevant pedagogies [Milner 2011], in part due to their own intersectional identities that have supported disidentification with unexamined Whiteness, as well as having close personal relationships with people of color [Johnson 2002]. For teachers, cultural competencies are built in the moment-to-moment decisions taken by teachers in the classroom each day with their students [Taylor 2017]. It is in these moments that teachers can choose to move towards or away from the goal of racial equity in pedagogy. An important aspect of moving towards equity is being able to recognize the complexity of interaction in the classroom. From a situated learning viewpoint, it may be argued that the work of teaching requires a deeply analytical perspective in which the teacher seeks to understand how "...categories and forms of social life...are (historically and culturally) produced and reproduced" [Lave and Wenger 1991, p. 38] such that they can disrupt the reproduction of societal inequities in their own classrooms.

We argue that teachers can be supported in developing situational awareness of racialized incidents in classrooms through case study analysis. In line with other story-based pedagogical modes that have been used to introduce White teachers to discussions of race (e.g., Matias and Grosland [2016]), case study analysis presents opportunities for teachers to reflect on race as an aspect of classroom interaction. Case study work can be seen as a first step in developing the analytical perspective needed to effectively change one's pedagogy. Towards this goal, we presented teachers with anonymized vignettes of real-life racialized incidents involving both teachers and students that were drawn from classroom observations gathered in the participating district. These case studies serve as clinical simulations [Dotger 2015] in which teachers can reflect upon and respond to a high-stakes classroom situation in a low-stakes setting [Sullivan et al. 2020]. Subsequent small group and whole group discussions provided opportunities for the range of teacher responses to be surfaced and discussed in support of deeper learning related to issues of racial equity in the classroom [Darling-Hammond et al. 2017]. Our analysis focuses on this range of responses that, in turn, will provide important insights into the design and development of further equity and

anti-racist based professional learning experiences for White teachers engaged in the CS for All movement.

3 CRITICAL WHITENESS STUDIES AND RACIAL LITERACY

Critical Whiteness studies [Kincheloe and Steinberg 1998; Leonardo 2014] provides a strong theoretical framework for examining the responses of White teachers to racialized incidents in the classroom. Critical Whiteness studies recognizes the dual nature of White culture as simultaneously hegemonic and, yet, invisible to many Whites, including White teachers. The invisibility of White culture to White teachers may well rest in individual experiences of ethnic and religious identities as primary [Picower 2009]. Indeed, essentializing Whiteness as a monolithic identity is problematic [Jupp et al. 2016]. That being said, as noted earlier, pro-White, racial hierarchy implicit bias continues to be observed in White teachers [Starck et al. 2020]. The invisibility of White hegemony to Whites manifests in specific concepts that work to uphold the power of Whites in society, including the notion of meritocracy [Milner 2010] and the claim of colorblindness [Milner 2010; Ullucci and Battey 2011]. It is the uninterrogated invisibility of White culture that allows well-intentioned Whites, including White teachers working in predominately non-White schools, to perpetuate racial inequities through unconsciously subscribing to these concepts.

Guinier [2004] develops the notion of racial literacy as a dynamic framework for understanding racism in the United States. Racial literacy recognizes existing racialized hierarchies and race narratives as promulgated historically by the most advantaged in society “to order social, economic, and political relations to their benefit” (p. 114), as discussed above. These hierarchies and narratives serve to reinforce difference and are then rationalized into arguments for the status quo. As one develops racial literacy, one develops consciousness related to these rationalizations, such that they become transparent aspects of White supremacy. For Guinier [2014], racial literacy is contrasted to racial liberalism in which racism is seen as a “...departure from the sound liberal project of American individualism, equality of opportunity, and upward mobility” (p. 114). Whereas racial literacy recognizes, as Leonardo [2014] puts it “...that the nation was created as a racial project” (p. 18), built on stolen land by stolen labor.

In this article, we use the terms “racial liberalism” and “racial literacy” to refer to the spectrum of consciousness about race represented in these two poles: racism as aberrant and racism as foundational to US society. We conceptualize this spectrum as a continuum. We argue that racial liberalism renders Whites susceptible to White supremacist rationalizations (meritocracy, colorblindness, etc.), whereas racial literacy positions the majority of Whites in solidarity with people of color in opposition to the “most advantaged” in society and their goals to maintain economic and political power. To move towards racial literacy, one must develop a historical, political, and economic analysis of the use of race as a tool for societal division and manipulation along racial lines.

3.1 Challenges for Whites in Moving Towards Racial Literacy

Sue [2011] has theorized that it is challenging for Whites to work towards racial literacy, because it requires acknowledgment of White people’s complicity in maintaining our racist US society—such an acknowledgment contradicts White people’s view of themselves as those who believe in “...cherished values of freedom, equality, the intrinsic worth of everyone, and the principles of democracy” [Sue 2011, p. 416]. As Tatum [1992] has demonstrated, their own complicity is challenging for Whites to contend with, as undergraduate White students experienced emotions ranging from guilt and shame to anger and despair when studying race-related content in a psychology class. Haynes [2021] in her study of White Racial Consciousness among higher education faculty reports just this finding as one of her White faculty research participants acknowledged

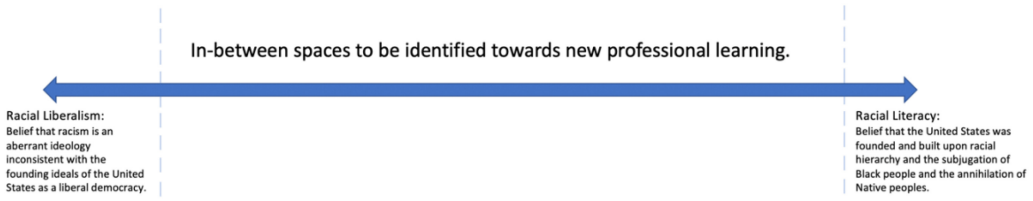


Fig. 1. Racial liberalism to racial literacy continuum.

about race and racism: “I can’t allow myself to feel any one way about it, because I’d just go crazy, when I realize what groups of people have went [*sic*] through and continue to go through” (p. 5). This personal discomfort with racism indicates a lack of understanding of Whiteness as a system [Blaisdell 2018] into which White people are inculcated from a very early age. This system includes the belief that “... certain groups are undesirable, inferior, and to be feared and avoided” [Sue 2011 p. 416]. The system is reinforced in multiple ways, from unfair policing practices to Jim Crow laws, to media portrayals, to inequitable school practices [Cheryan 2013; Margolis et al. 2017; Watson 2017]. To avoid this discomfort, Whites may engage in a number of strategies including what is known as “White talk” [McIntyre 1997], a style of discourse designed to avoid and evade White responsibility for racism.

Our survey approach aims to surface White teacher’s ideas about race and racism as they are expressed in relation to anonymized, local, real-life racialized classroom incidents. The case studies are drawn from the participating school district, thereby allowing teachers to recognize and connect with the classroom interaction portrayed. However, they are being asked to reflect on another, anonymous teacher’s practice, which potentially provides emotional distance that may enable teachers to avoid “White talk” and take up issues of race and racism in the classroom. We argue that these elements of the case study design potentially allow teachers to delve deeper into discussion of race and racism in the classroom. These discussions, in turn, will provide insight into how teachers’ racial beliefs may be enacted pedagogically and in interactions with students and each other. Our study addresses the following research question: “How do primarily White teachers in a CS for All PD context take up racialized case study incidents and what is the range of responses along the racial liberalism to racial literacy continuum evidenced by teachers?”

To support our exploration of the research question, we have developed a continuum visualization, featuring two poles (see Figure 1) rooted in our racial literacy theoretical framework. At the beginning of the continuum is the racial liberalism ideology, at the other end is the racial literacy ideology. We place the notion of racial liberalism at the beginning, because we believe that racial liberalism is the default position for White people. In other words, racial liberalism is the context in which K–12 education unfolds in the United States. This is so because the majority of K–12 US teachers are White [National Center for Educational Statistics 2019], and, as has been previously discussed in this article, the cultural beliefs of Whites are rooted in myths of White supremacy and individualism and these beliefs remain the dominant racial viewpoint for many Whites, including teachers [Starck et al. 2020]. Meanwhile, also as noted earlier, many colleges of education and, indeed, programs such as the CS for All movement, have worked hard to introduce practices of racial literacy to pre-service and in-service teachers. Therefore, we hypothesize that few teachers will entirely espouse racially liberal or racially literate views, rather people will likely express mixed views. We argue that identifying these views allows for the development of a deeper and more nuanced understanding of White teachers’ racial beliefs as they are expressed in response to the CS for All case studies. Uncovering these views will support the design and development of useful professional learning opportunities that support CS for All.

4 METHODS

We came to this work within the context of a larger **research practice partnership (RPP)** that had been framed around equity and the creation of CS learning opportunities for all. However, within the first several months of the project, it became clear that definitions of equity varied widely within the larger group, some of us had a critical lens, and some positioned equity as an issue of access. The authors came together to both conduct research within the RPP from a critical lens and to support the groups' evolution in deepening their equity understanding. We assert that truly equitable outcomes will only be achieved through the direct dismantling of White supremacist systems that underlie institutional life in the United States. The authors' critical lens and this research study come from these discussions and jointly held convictions regarding addressing White supremacy as a key driver of inequity in classrooms.

Sneha Veeragoudar identifies as a person of color and is a first-generation immigrant from a working-class family who grew up in under-resourced urban Southern California schools and navigated complexities of race in a large, nearly entirely Black and Chicana/o K–12 student body and overwhelmingly white teaching force. These experiences informed and developed her lenses on (in)justice and (in)equity. She is also steeped in the enterprise of learning from the perspective of being a parent of a multi-heritage child who is being raised to deeply engage and identify with both heritages.

Florence Sullivan is a White lesbian from a lower middle-class, rural Northern California family who initially developed elements of race consciousness through coursework, as well as protesting the promulgation of anti-Latino/a laws in the state of California in the late 1990s. Florence has worked to further develop her understanding of her own positionality as a White researcher through readings, webinars, and close collaborative relationships with faculty of color at her home institution. These efforts have contributed to her ongoing development of a critical lens on racial equity. Florence views herself as a learner in this space and agrees with Patton and Haynes [2020] that for White people, unlearning racism is a lifelong endeavor, to which one must be fully committed.

This study took place as part of an ongoing RPP between a mid-sized urban school district (pseudonym = Summerland) and a research university in western Massachusetts. The RPP is focused on the creation and implementation of **computational thinking (CT)**-integrated elementary school lessons, as well as the creation of equity-based, CS professional development and professional learning communities aimed at learning about, integrating, and teaching CT. While the main partnership exists between the researchers, district administration, and teacher leaders, many classroom teachers and their students have taken part in the project over the past four years.

4.1 Participants

The work reported here took place in the context of equity-based, CS professional development. Participants were 65 elementary-level teachers attending a five-part CS for All PD workshop series that unfolded over several months. According to the Massachusetts Department of Elementary and Secondary Education (2020), the racial make-up of Summerland Public School teachers is 68% White, 15% Black, 15.5% Latinx, 1% Asian, and 0.5% Multiracial. Meanwhile, 79% of the teaching force in Summerland is female, and 21% is male (no data were available on alternative gender identities). Our participants for this study were primarily female (one male) and majority White. Due to varying attendance across the five professional development sessions provided to teachers during this study, different amounts of data across sessions were collected. We report the actual numbers of participants for each data collection point below. All data are reported verbatim. In other words, we have not corrected for grammatical errors; we simply transcribed teachers' written responses. We believe this provides a level of authenticity to the data that preserves meaning.

4.2 Research Design

We have conducted both survey and observational research with teachers to investigate our research question. Our survey research includes the use of open-ended instruments to collect teachers' ideas related to both computer science and racialized incidents in the classroom. We developed two classroom vignettes based on our own classroom observations and field notes gathered in the prior year of the research practice partnership. These vignettes were provided as written case study surveys for teachers to read, reflect upon, and then to provide written responses to the open-ended questions posed. Teachers read and responded to the vignettes individually, then engaged in small group discussion, and finally, whole group share-out. One of the small group discussions and both whole group share-outs were video- and audio-recorded. Transcripts were developed for all of the recorded observational data.

The first case study survey (Appendix A.1) details a learning situation in which a White teacher ("Ms. Smith") makes negative remarks about a Black student's ("Jasmine") performance on a CS-based class activity when Jasmine is temporarily out of the classroom. In this first vignette, the teachers are asked to follow an "I notice/I wonder" protocol in which they write down what they notice about the case and what they wonder about the case. The lack of question specificity in this instrument was deliberate in that the research team wished to uncover the extent to which the teachers' notice and thought about the racialized nature of the situation. The second case study (Appendix A.2) presents a scenario in which a White teacher ("Ms. Simon") overhears a White student ("Mary") make a disparaging remark about the CS-abilities of a Latina ("Rosa") who is an emergent bilingual student and a member of Mary's small collaborative learning group. In this second scenario, teacher participants are asked to provide advice to Ms. Simon on how to handle the situation and to explicitly address whether race is relevant in the student interaction.

As Berends [2006] notes, survey research aims "...to describe relevant characteristics of individuals..." (p. 623). In our case, the goal of our survey research was twofold: First, we sought to develop an understanding of teachers' characterizations of computer scientists, and in particular the adjectives used to describe such individuals. These data would help us understand the degree to which teachers view CS as an activity suited for White and Asian males. Meanwhile, our vignette-based survey provides data with which we can investigate whether and how teachers ascribe to racial liberalism viewpoints and/or lean towards racial literacy in their reflections on the vignettes.

We also collected survey responses from teachers towards the end of the school year in the fifth professional development session we held with them. These survey questions were evaluative in nature. We sought to understand the teachers' overall experience of the professional development series and what we could do to improve our offerings. A total of 21 teachers attended this final professional development session that was held completely online due to the onset of the COVID-19 pandemic. The survey consisted of 15 questions that covered the totality of our professional development topics, not just our focus on equity. We asked two questions focused on equity as follows: (1) Were the equity case study activities presented in the professional development sessions useful to you? (2) Please explain your above answer in greater detail. Teachers were given the option of responding "Yes, Maybe, or No" to question 1, and they were provided with the opportunity to write an open-ended response to question 2. We provide the responses to these two survey questions in the results section below.

4.3 Data Analysis

Our unit of analysis for analyzing the open-ended case study survey responses was at the level of the utterance. Teachers were asked two open-ended questions on each of the surveys; each independent response was considered an utterance. A total of 65 participants engaged in various

aspects of this study. Two sets of teachers came together on the first day of professional development to be introduced to the overall project. After the first day of PD, teachers were split into two groups, one group consisted of kindergarten and grade-three teachers who would be adopting curriculum developed on the project in the prior year. The second group of teachers (grades one and four) worked together to develop CT-integrated curriculum anew. It is the former group we are concerned with in this study. On days two and three of the professional development series, a total of 44 teachers attended and engaged in the first vignette, and a total of 27 teachers attended and engaged with the second vignette. It is important to note that these three professional development sessions were spaced out over a period of three months (one per month). Therefore, attrition in attendance was due to the fact that the third PD session occurred later into the actual school year, and teacher involvement was affected by the overall demands of teaching. There was a total of 142 responses across the entire dataset. In terms of the first survey, one participant left one response blank, and in the second survey, no participants left blank responses.

To analyze these data, we engaged in thematic and iterative coding based on our theoretical framework [Strauss and Corbin 1999]. These codes included the following constructs: colorblind, meritocracy, deficit thinking, deflection and evasion, perspective taking, empathy, and race consciousness. The authors independently coded the two open-ended, case study, written response datasets and then met to discuss the codes and data further. We engaged in an iterative process of coding data and discussing the codes to arrive at our final set of codes and coded data.

In addition to the survey data, we transcribed and analyzed the whole group discussions and one small group discussion that occurred during the two workshop sessions where these data were collected. After the teachers independently completed the open-ended case study, they came back together into small groups and discussed the vignette as a whole. Then the teachers shared their small group discussions to the whole group and a larger discussion ensued. The whole group share-outs were recorded for each workshop and one small group discussion was audiotaped during the second workshop. The unit of analysis for these transcripts was the spoken utterance bounded by turns of talk. In other words, an utterance began when an individual began speaking and ended when a different individual spoke. We used the codes developed for the vignette-based, open-ended surveys to independently review, code, and discuss the whole group and small group transcripts.

Once the initial round of coding was complete, we then categorized teacher responses further into overall categories that accord with points along our racial liberalism to racial literacy continuum. These points, in general, either reflect more of a racial liberalism view (including colorblind, meritocratic, and deficit thinking viewpoints) or a view that maps closer to a mid-point between the two poles, which includes empathetic views, or a viewpoint that we are calling the teacher champion viewpoint, in which the comments are much closer to the racial literacy pole. We do not believe that there is a final arrival or endpoint on this continuum, rather people continue to move towards (or away from) racial literacy.

In terms of the evaluative survey responses gathered on the last professional development session of the school year, we provide descriptive analysis of both questions one and two.

5 RESULTS

As regards our research question “How do primarily White teachers in a CS for All PD context take up racialized case study incidents and what is the range of responses along the racial liberalism to racial literacy continuum evidenced by teachers?” we have developed three points along the continuum to help describe the comments provided by teachers (see Figure 2). The beginning section on the continuum leans toward racial liberalism (colorblind and meritocratic comments); the middle space on the continuum occupies an in-between space (in which avoidance and resistance to talking about race are frequent), and last, the section closer to the end of the continuum

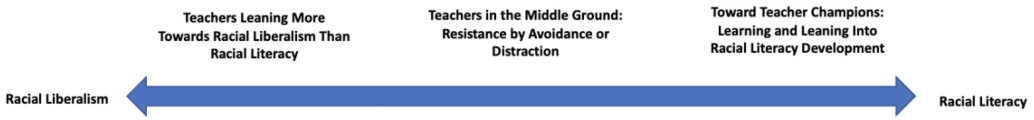


Fig. 2. Continuum reflecting teacher stances.

indicates reaching towards racial literacy (these comments centralize students and often engage race directly).

Table 1 below summarizes our analysis across the categories in the continuum. Each category in the spectrum above is broken down into types of responses that reflect attributes typical of a person on that location on the spectrum. Examples and analysis of each type are given in the table. The first result in the table summarized share types of responses typical to a person closer to the racial liberalism end of the continuum. The second result subsection share types of responses typical to a person in the middle section of the continuum. The third result share types of responses typical to a person closer to the racial literacy end of the continuum.

The first result, summarized in the row Teachers Closer to Racial Liberalism in Table 1, represents 19 of 44 teacher participants responding to the first case study and 7 of 27 teacher participants responding to the second case study who made statements indicating a lean towards racial liberalism, though not fully embracing a wholly racial liberal worldview. Key aspects of racial liberalism that inform their teaching practice are colorblindness, faith in individual meritocracy, and implicitly biased views even as they may be unaware that they hold those views.

The second result, summarized in the row Teachers in the Middle Ground in Table 1, presents the views of White teachers in our study who demonstrated resistance, by way of avoidance or distraction, to responding in racial terms to explicitly race-conscious PD. Still, while these participants sometimes made statements that can be deemed as colorblind, individual meritocratic, or implicitly biased, the distinguishing characteristics of this group in the middle category on the continuum is that they verbally affirm work in equity as positive and worthwhile but then pivot away from going deeper into the work of advancing equity. One may argue that these teachers engage in “White talk.” As such, these teachers sometimes make comments that are characteristic of individuals on the racial liberalism side of the continuum.

The third result, summarized in the row Toward Teacher Champions in Table 1, are participants engaged in the journey towards becoming teacher champions of a racial literacy viewpoint. The range of knowledge, conceptualizations, and personal experiences that qualify as “toward teacher champion” is quite broad. Consistent with the viewpoint that overcoming the teachings of White supremacy is life-long work for Whites [Patton and Haynes 2020], we do not see a destination point that once arrived at, the work of those who are racially literate is complete. The work, the drive to deepen understanding and gain knowledge is never complete, and the journey of unlearning racism is ongoing. As such, we also wanted to include teachers who only are beginning their journey as teacher champions. Therefore, the teacher champion section of the spectrum accommodates teacher participants whose comments were non-racial, yet student-centered, as well as teachers whose comments indicated race-consciousness in their personal lives, students’ lives, classrooms, and/or at the institutional level. This section of the spectrum is broken into four subsections. The first is Toward Teacher Champion: Non-Racial, Yet Student-Centered and is exemplified in participants en route towards teacher champion in racial literacy whose views do not address race directly but do indicate interest in the perspectives and experiences of the student. The second is Toward Teacher Champion: Race-Conscious and is exemplified by participants whose views are race-conscious. The third section is Toward Teacher Champion: Nuances, Synergies, and Contradictions in Individual Thinking in which we focus on just one participant’s statements to highlight

Table 1. Teacher Responses to Racialized Case Studies Categorized on the Racial Literacy Continuum

Racial Liberalism Racial Literacy Spectrum Category	Discourse category typical to this racial liberalism racial literacy spectrum category	Example of discourse	Analysis of discourse
Teachers Closer to Racial Liberalism	colorblind	“Why does race matter?”	<i>A colorblind view of the world holds a lens on the world in which race is not relevant.</i>
	Individual meritocracy	“I noticed the teacher gives preference to certain students because of ability.”	<i>The teacher focuses on their perception of a student’s individual achievement to ascribe preference without a historical lens or a structural frame.</i>
	Implicit bias	“She is from PR [Puerto Rico] so may not have been fortunate to been exposed to this type of technology lessons.”	<i>With no other knowledge than geographical origin of the student the teacher is suggesting lack of exposure to computing education.</i>
Teachers in the Middle Ground	Resistance by way of avoidance	“Some people are very comfortable talking about race, and others still may have cultural or personal blocks to where to begin speaking on this sensitive subject.”	<i>While it is impossible to know if some responses that did not mention race were acts of conscious or unconscious avoidance, we do have individuals explicitly stating some teachers avoid talking about race due to discomfort.</i>
	Resistance by way of distraction and re-focusing discourse on other forms of inequities	“I don’t know if race is true issue for the students, but the colleagues’ POV should understand that the language barrier is the biggest problem here.”	<i>Participant resists attending to race and instead focuses on language-related issues.</i>
	Resistance by way of distraction and re-focusing discourse on challenges of teaching	“It’s always a challenge in that particular setting, as well as any other type of mixed classroom, whether they’re ELL students, or link students, or higher... students who may be advanced and need that... or are ready for a bit more.”	<i>Participant resists attending to race and instead focuses on how difficult it is to teach in a class with varying student needs.</i>
	Resistance by way of distraction and re-focusing discourse on teacher intentions	“Now I’m thinking that we started by criticizing this teacher. And she could have been frustrated by a lot of things going on.”	<i>Participant resists attending to race and instead focuses on their perception of the teachers’ intentions.</i>
Toward Teacher Champions	Non-racial, Student-oriented	“The teacher placed in a group to meet, meet her group needs, not Jasmine’s. She said something about Jasmine behind her back, isolating her.”	<i>Participant acknowledging the ways in which teachers’ statements and actions could potentially impact the student, yet without acknowledging any possible racial component involved.</i>
	Race-conscious	“If you mentioned white privilege that there’s huge defensiveness, and where people haven’t had an opportunity to learn about their white privilege, or it’s like that white fragility. It’s like, ‘Oh, I’m not a racist.’ I see that is, it’s stagnant. There’s not any opportunity to even grow because no one wants to talk about it ‘cause it’s painful.”	<i>Participant highlights sensitivities and difficulties involved in long-term race-related PD efforts.</i>

(Continued)

Table 1. Continued

Racial Liberalism Racial Literacy Spectrum Category	Discourse category typical to this racial liberalism racial literacy spectrum category	Example of discourse	Analysis of discourse
	Nuances, Synergies, and Contradictions in Individual Thinking	"Empathy. But also it's a real sign to me that there's some cultural diversity, appreciation, empathy needed in that class..."	<i>Participant acknowledges individual kindness and understanding are important but that there are additional components to group learning such as cultural diversity and mutual respect.</i>
	Nuances, Synergies, and Contradictions in Group Thinking	Speaker 2: "It's a cultural respect inequity...It was the assumption that she's dumb because she's Spanish..." ... Speaker 2: "And then, I've had people say, 'Oh, they don't care about their kids,' this, this, and that. And I'm like, 'No, it's not that the parents don't care,' it's that they don't know because they're not educated." Speaker 4: "That's right, they don't know...And some, not all, put their trust into us." Speaker 2: "I mean it's hard to, it's hard to do that when you're in... but you know...When the kids would come in and they don't know anything..." ... Speaker 2: "You can't help that if parents aren't literate enough."	<i>Participant identifies an issue of students making an assumption relating knowledge of the English language with intelligence yet she, herself, later assumes the same students' parents are "not educated" or "literate." Sandwiched between these comments is a defense of parents who should not be accused of not caring.</i>

the tensions and intricacies of simultaneously holding both race-conscious and implicitly biased views. The fourth section is Toward Teacher Champion: Nuances, Synergies, and Contradictions in Group Thinking. Here, we look at a series of conversation segments from a group discussion in which we parallel the kind of nuance and contradictions similar to that which we presented in an individual in the third subsection but in a group context. Please note, all verbatim discourse is presented in quotation marks, all analysis is italicized.

5.1 Teacher Champions: Nuances, Synergies, and Contradictions in Individual Thinking

Below, in Table 2, we expand on the summary of the penultimate category of the Toward Teacher Champion, that is Nuances, Synergies, and Contradictions in Individual Thinking. Table 2 presents the remarks of one teacher participant made during the PD workshop featuring the second case study (see Appendix A.2). These comments are drawn from the small group dialogue, of which she was a part. The comments are presented chronologically, as they were spoken by the teacher, but lifted out of the context of the small group dialogue. We present these comments to demonstrate the complexity of an individual teacher's views in terms of existing contradictions evident in statements made. All of the contradictions in statements are based in a tension between her implicit biases with her effort to make forward strides in acknowledging and advancing equity in the classroom. Here, we can see that for White teachers developing one's racial literacy requires

Table 2. Analysis of One Individual's Utterances over the Case Study Discussion

Utterance	Analysis
"We think. . . I'm reminded of, my father a graduate technician who was from Estonian. He used to always say, he goes, 'Just because I talk with an accent doesn't mean I think with an accent,'" "And I think that they maybe are diminishing what Rosa brings to the table." "She might've had a lot of knowledge about plants, maybe she came from a rural area in Puerto Rico."	<i>She draws on personal experience to relate to the experience of marginalization. In this case it relates to an experience with language and cognition, which is a major theme in Case Study 2 (Rosa).</i> <i>She recognizes the deficit-oriented view with which some students are viewing Rosa. As a counter to this deficit-oriented perspective, the teacher participant offers an attempt at an asset-oriented perspective of Rosa with her reference to Rosa having "a lot of knowledge." However, as she continues speaking, we see that the example she provides can be argued as implicitly biased. Her example to demonstrate Rosa's knowledge cites her knowledge of "plants" and states the possibility that she is from "a rural area," though she has no basis for this in the case study vignette provided. Rather, she is constructing her own example that could be seen as viewing Rosa and her Puerto Rican roots as closer to nature, possibly as a positive, or possibly deriving from a perspective of more primitive.</i>
"And a lot of times children are silent when they're learning a second language, but they can understand a lot"	<i>In this statement she again affirms that a student's silence or early stages of emerging bilingualism should not be mistaken for their comprehension of content.</i>
"So I'm just really concerned that they really could have crushed her a lot. . ."	<i>She shows compassion for Rosa and connects affect to learning. She is conveying that student identity is integral to learning and her peers not seeing her as a capable learner can have a chilling, negative impact.</i>
"And also this is a child who's on an IEP, who may have some learning disabilities on top of an ELL, on top of probably being a phase one ELL or someone who just came from Puerto Rico. So she's got a lot of barriers, and I think people need to understand those barriers, and the children need to be made aware. Privately, and perhaps collectively that it's not easy. It's not easy."	<i>And again, we see a deficit perspective and implicit bias in which she highlights barriers and makes assumptions about what it means to be "someone who just came from Puerto Rico."</i> <i>From a place of compassion and leadership, she wants other students to understand these issues but also seems to comprehend getting to a place where we can talk about these issues with other kids in the class is not easy.</i>

attention to several aspects of one's own thinking and that blind spots to one's racism persist. We present the utterances made by the teacher in the left column and our analysis of each comment in the right column.

In these comments, we see a teacher who is meaningfully grappling with issues of race, language, and deficit perspectives of children in her classroom while they are additionally situated in a larger class ecology, rife with nuance and complexities in which emotions, identities, histories, visible and invisible, inform participation and engagement. The contradictions in this teacher's statements revolve around her view of Puerto Rico and the experiences of children in Puerto Rico prior to arriving in the continental United States. The idea of Puerto Rico as a more rural and less sophisticated place for people to learn and grow up shows up in her thinking and can be seen as a deficit view rooted in race and language. However, we also see that the teacher is eager to consider Rosa's assets, including her comparison of Rosa to her own father, particularly as it regards language and cognition. This teacher is developing race consciousness and is well positioned to grow towards greater racial literacy with specific follow-up work around issues of deficit thinking and the island of Puerto Rico. She is, as a teacher champion, exemplifying leadership qualities around race and equity yet simultaneously acts in direct contradiction through expression of her own set of mislaid assumptions and implicit biases.

5.2 Teacher Champions: Nuances, Synergies, and Contradictions in Group Thinking

Below, in Tables 3 through 7, we analyze a group conversation organized into thematic clusters. In our analysis, we highlight the ways in which teachers are simultaneously moving towards racial literacy while continuing to espouse deficit viewpoints related to students and parents of color. We argue that through engagement with the authentic Summerland case studies, these contradictions surfaced. Moreover, surfacing such contradictions in thinking is crucial to the work of developing racial consciousness and moving towards racial literacy. We also point out where and how teachers are providing leadership in thinking about race and racism in the classroom and the district. The conversational segments are reported chronologically, and the clustered utterances unfolded in time as shown. However, we are not reporting the entire small group dialogue here. Not all the conversation was relevant to our research question. Therefore, irrelevant sections were not analyzed or included.

Beginning with Table 3, the conversation is squarely grounded in the discussion of the case study. From the outset there is an acknowledgment that the incident needs to be addressed, which should not be taken for granted. How the incident should be responded to varies depending on the participant, some suggesting pulling one individual to the side for a conversation and others believing the entire class would benefit from a discussion and presentation of Rosa in an asset-oriented perspective. This conversation on how to respond to the incident begins with a frame of kindness and empathy but as the teachers continue talking, there is a link being made to culture.

In Table 3, we see the range of responses to the incident includes that it needs to be acknowledged and addressed, which we should not take for granted, since some teachers may have left the remark unaddressed, and then ranges from thoughts of pulling one individual to the side for a conversation, second that there is a need for a discussion of empathy in the class, to deciding the entire class would benefit from a discussion and presentation of Rosa in an asset-oriented lens. Here, we see the first foray into the teachers making a direct link from the incident to issues pertaining to culture and respect, though in this initial formulation it is still talked about in general terms of culture and diversity and not in more specific terms of race, language, immigration, place of origin, and so on.

The discussion among the teachers continues as shown below in Table 4 and directly incorporates race and power into the conversation. While the conversation starter was the case study of

Table 3. Responding to the Case Study

Conversation Segment #	Speakers and Utterances	Analysis
1	Speaker 2: “We would have addressed it pretty much right away. Speaker 3: I might’ve pulled her away. [“her” references Mary] Speaker 2: Yeah. Pulled her aside. Speaker 3: Yeah, probably the group of girls aside, because a lot of times children who are ELL are silent, they understand a lot more than [crosstalk]. Speaker 2: Yeah, we said the same, I would pull her aside, meaning the one who made the comment, meaning Mary, and then also talk to her, but then also think about. We’re really frustrated. You’ve run into a lot of problems. Can you imagine doing this in another language?”	<i>Participants verbally acknowledge there was an incident in class worthy of swift intervention with the individual who made the remark or the group of students present when the remark was made. This intervention, according to these participants, involves invoking compassion and empathy towards Rosa and her being an emergent bilingual person.</i>
2	Speaker 2: “Empathy. But also it’s a real sign to me that there’s some cultural diversity, appreciation, empathy needed in that class, and that would tell me the... Speaker 4: You need to stop right there and impress those kinds of things. Speaker 2: That’s how I think. Yeah. Speaker 4: Even the whole class. This is going on with one student, it’s probably going on with others. Speaker 3: And she might have some really good skills to bring to the table. I mean, if she’s from Puerto Rico she might have some experiences... Speaker 2: (interjecting) ...and that’s usually what teachers will do, is bring out positive light. Also, I brought up the fact that she’s going to remind students that in the future, Rosa will have more advantage being bilingual. [Crosstalk 00:40:37]. Very important, you want to point out the strengths of the student someone else is ostracizing.”	<i>Participants continue the discussion, digging deeper into exploring the incident and displaying a willingness to hold up the incident for examination and reexamination. These participants determine intervention should go further than invoking compassion and empathy because there are related additional issues pertaining to respect for culture and diversity. There is a shift beyond addressing the matter with the individual or small group to seeing benefit to addressing the issue with the whole class. Last, we see a move to frame Rosa in an asset orientation among her peer group with the indication that her bilingualism will be an advantage.</i>

Table 4. Incorporation of Race and Power in Conversation

Conversation Segment #	Speakers and Utterances	Analysis
3	Speaker 4: “I wonder if too, there’s that Mary the white girl has the power, and they’re Spanish speakers, so maybe there’s a bit of [crosstalk 00:41:18] Right exactly. There’s that. Speaker 3: They’re a bit quiet and they don’t see it to be exactly true. When they’re in that kind of situation. The second part, I was like, ‘I don’t understand how racism figured in.’ Speaker 4: You don’t?”	<i>A shift in the conversation acknowledges high level structures relating the incident to race and power, connecting the in-class incident to larger historical and structural issues. In this exchange, we see a challenge to this incorporation of race and power into the discussion. What is key to notice in this exchange is what happens after this challenge: the conversation continues. The introduction of race and power into the conversation is not avoided or otherwise resisted, though it is challenged and followed with authentic exchange. This exchange is emblematic of the nature of the dialogue teachers exhibiting leadership engage in, there is no avoidance, resistance, or attempt to minimize discussions that straddle classroom incidents and tensions around race, language, and culture. In other words, there is little to no “White talk.”</i>
4	Speaker 3: “Not really, because most of the differences are not part of the same thing actually. And in Puerto Rico, you can have somebody that looks ethnically, like they’re African American. In the family it’s the same thing: you can have a blonde-haired blue-eyed child and the other kids are mixed. So, it’s not unusual. Speaker 2: It’s a cultural respect inequity I think [crosstalk 00:41:56] but to me it’s like she related it with being dumb: not ugly or, I don’t know. It was the assumption that she’s dumb because she’s Spanish, I put a deep-seated negative feeling. Speaker 3: I was more... I was more thinking about how the policy played into it. Like, ‘no it was not racial.’”	<i>Here, we see Speaker 3 cite that we cannot know if the issue is racism because Rosa is from a group in which we cannot make assumptions about looks, that is for example whether she appears to look more African American or more White. Speaker 2 jumps in and says that is a non-issue here because the basis of the prejudice is not necessarily based on skin color or ethnic appearance, but rather the key idea that drives Mary’s comment is her knowledge that Rosa is Puerto Rican. Speaker 2 seems to highlight that Mary is operating with the bias that Rosa is dumb due to not knowing the language and since we do not know what Rosa looks like we cannot say this incident is about race, though we can still substantiate the claim it is about cultural disrespect and de-valuing English Language Learners’ intelligence and capacity. Teacher leaders engage in nuanced conversations such as this that sometimes seek to detangle complexly woven issues of race, language, class, and culture. They do not shy away from the complexity, they openly question other teachers and continue to stay engaged in the conversation.</i>

(Continued)

Table 4. Continued

Conversation Segment #	Speakers and Utterances	Analysis
5	Speaker 2: “Well I think what the problem here is that the teachers overlook when students address racism. Conversations need to be had by staff about changing the classroom. When a student says a child isn’t smart because they don’t want certain ethnic roots or looks, is something that has to be addressed. We’re not doing that in our schools.” Speaker 3: No, we’re not. Speaker 2: We’re not teaching teachers.”	<i>The teachers connect the larger issues of race and power with systems inside their institution. They are no longer focused on the specifics of this case study, not just talking about this particular teacher but about the staff as a whole (not) having conversations about race.</i>
6	Speaker 2: “And then there are teachers that are prejudiced, and we need to, I mean I worked with one that treated the kids differently. They each have their own point of view because they haven’t been addressed in our schools. Some students, even at the third-grade level, are questioning their identities. You know, if they’re a boy or a girl, it’s happening at all levels.” Speaker 3: I just went to the LGBTQ workshop. Speaker 2: Oh yeah? We were talking a lot about [crosstalk 00:43:14] and I have girls that are questioning this stuff. You can deal with boys; you might have some girls here. And we need to be upfront about things that wouldn’t have happened 10 years ago. So, we need to have these conversations as teachers because there aren’t teachers...”	<i>They are naming the problem of biased individuals and reinforcing that the solutions lie in the institutional sponsoring of training and facilitation of ongoing conversations.</i>

one specific incident and the teachers began the conversation as being about kindness, they shift here to interrogating the case from a lens of race and power. As the conversation continues, we see that these teachers working in the racial literacy zone of the spectrum grapple with race as well as colorism and openly engage in critical equity dialogue.

Table 4 exemplifies how teacher champions who are operating in the racial literacy portion of the spectrum hold the capacity for sustained grappling with complexities associated with equity. In this case, teachers ponder and have open dialogue about prejudice, colorism, racism, and more in a way that genuinely explores and even challenges each other. The key to the actualization of leadership teacher champions can exemplify is not a specific piece of knowledge, or even a specific

Table 5. Personal Points of Entry - Classism

Conversation Segment #	Speakers and Utterances	Analysis
7	Speaker 3: “And especially, I mean it’s... we’re all born and bred, pretty much in Summerland. And you know, if you don’t... if you’re not plugged into like, these student’s lives, and their kind of culture, then that’s like you know... really... like ‘no.’... But usually a college experience, for some parts of us, that didn’t come from a rich background, or ‘home’ environment, that when you go to school, that’s where you are encountering other you know...” Speaker 2: And I also think like you know, when she was sharing about her like challenges, or whatever, socioeconomically I think too that, I stick to my opinion, what I’ve experienced. People come from blue collar, working class, or a struggling socioeconomic are more empathetic.”	<i>This conversation shows a different side to teacher champions demonstrating leadership. This side is trying to find inroads to understanding or relating to students’ lives, challenges, and the kind of biases many encounter. There is an assumption made that “we’re all born and bred” in a particular place. It is possible she knows all the teachers in the discussion and in fact that they are from Summerland. The participant speaks of “these student’s lives, and their kind of culture” but it is unclear what she thinks this means in a district as diverse as Summerland. What does “their kind of culture” mean in her mind?</i>

set of experiences, but rather their willingness to stay engaged in the face of difficult, painful, complex conversations, challenge each other, introspect, take ownership of their contributions and their growth.

In Table 5, we see that teachers transition to a personal tone, finding entry points into understanding the case study through their own set of personal life experiences. For the teachers in Table 5, that entry point was not experience with racism but another form of bias, in this case specifically they shared their experiences with classism.

Teacher champions demonstrate leadership in their development of racial literacy in that they are finding the element of human connection in their interrogation of this incident. They see themselves as different from the students, yet they try to use their own personal experiences with other forms of bias to connect to the lives and experiences of students.

In Table 6, we see clear examples of contradictory viewpoints being expressed. As noted earlier, engagement with the case studies has allowed the teachers to reflect on race in the Summerland school district and this has surfaced contradictions in which the teachers both defend and hold deficit views of Summerland parents and students.

In Table 6, we clearly see the tensions of negotiating asset and deficit thinking and of the ways in which implicit biases and assumptions are laced into teacher champions’ continued growth as leaders. The key takeaway from Table 6 is that they remain engaged in discussion, looking at the potential role of class versus racism or other issues involved. None seem to avoid or defer the discussion; none seem afraid to engage difficult topics and challenge each other while continuing to introspect and stay committed to the conversation.

In the closing section of the small group dialogue analysis (Table 7), we see a profound turn in the conversation, again demonstrating the leadership of the teacher champions. Their attention

Table 6. Deficit Views of Summerland Students and Parents

Conversation Segment #	Speakers and Utterances	Analysis
8	Speaker 2: “And then, I’ve had people say, ‘Oh, they don’t care about their kids,’ this, this, and that. And I’m like, ‘No, it’s not that the parents don’t care,’ it’s that they don’t know because they’re not educated.” Speaker 4: That’s right, they don’t know....And some, not all, put their trust into us. Speaker 2: You know, I remember some parents coming to me, ‘Don’t teach them Spanish.’ Speaker 4: You know, ‘that’s what we do, we’re gonna teach them Spanish.’ You know, we want them to be bi-lingual. You know so, they’re like, ‘just teach them English.’ And it’s totally reversed, but without them teaching them Spanish...Because they are not getting jobs in Spanish, so they said, ‘Well, we don’t want ‘em to speak Spanish, we want ‘em to speak English.’ Speaker 3: Oh, I remember that, when we used to have that bilingual program. (unintelligible) Speaker 2: I mean it’s hard to, it’s hard to do that when you’re in... but you know...When the kids would come in and they don’t know anything... Speaker 2: You can’t help that if parents aren’t literate enough.”	<i>Participants are simultaneously offering a kind of compassion towards parents, defending them from claims that they do not care about their kids or their kids’ education and in the same breath offering their own assumptions and biases when they state the parents are not educated. Furthermore, they are conflating knowledge of language with knowledge of content in general. When speaker 2 says kids “don’t know anything” we might assume she means they do not yet know any English yet but by stating the “anything” part they are reifying the idea that if you do not know how to communicate it in English, it is not legitimate knowledge.</i>
9	Speaker 4: “I think that’s why...to me it’s just such a big class. We have these parents that are...I think that’s part of our struggle, is that parents are not always teaching the things that we might, so we are you know...kids are clashing.” Speaker 3: So, it’s much more of a class issue? Speaker 4: Yeah, yeah...”	<i>Here, we see reference to intersectional issues in which class is seen as relevant. However, it is an oversimplification to see this scenario either as related to race or class, a binary perspective instead of an intersectional perspective. Additionally, it is not clear what the teacher believes the parents are not teaching that they themselves are, and what it means for her when she says, “kids are clashing.” Regardless, the statement is built on assumptions that the parents are not teaching something they should and that creates challenges for the teacher. When Speaker 4 indicates parents might not teach “things that we might” it is not clear if she means things that they as teachers might teach or as parents. Regardless, there is a tension in superficially indicating an asset-oriented view of Rosa and the ways the teachers talk about valuing language and knowledge across students and their families. Here, we do not see the teachers valuing the language skills, the potential set of broader knowledge, skills, life experiences parents may be bringing. This asset-orientation they earlier exhibited towards Rosa is not being extended more broadly to parents.</i>

Table 7. A Critical Lens and the Contradiction of Generalized Difference

Conversation Segment #	Speakers and Utterances	Analysis
10	Speaker 4: “And then sometimes I question our theories. Some of those of what we suppose a classroom to be like, especially in an inner city. I mean, I chose to work in an inner city, and I know, I know that there are people that would not want to teach in an inner city, but you know this is the problem we’re having. Young people don’t know what it’s like, and we need to let them see that. And I think Summerland is like that, and I know I’ve said it many times: we put up blinders, and we think we’re wonderful. . . . Speaker 2: Oh yeah, we don’t see color. Speaker 4: We think we’re wonderful in all aspects. You know, because we have (unintelligible) and it’s the 21st century, and you know. . . we have so much. . . so much. Speaker 2: Oh, and you know. . . And I’m just thinking about new teachers, when they come in, I don’t think that all seasoned teachers are like. . . racist or anything, but they help you to be like. . . thinking about it. Like they were so confident or didn’t feel like something was. . . like we were touching, or now we’re saying that 90% of our kids are bad, or have poor mechanics. Speaker 3: How are we not walking out? Speaker 4: Exactly. Speaker 2: That’s like it. That’s American. In my opinion, that’s how I view it. Speaker 2: Let’s just look the other way, let’s just continue what we’re doing until it passes.”	<i>In this passage, we see a distinction being made between seasoned older teachers and new teachers. Both are colorblind and a connection to a broader American colorblindness is made, yet the newer teachers are seen or perceived as believing they have confronted and completed dealing with race by their decision to teach in a predominantly non-White student demographic district. This view allows them to avoid the topic of race altogether, since they perceive it to be something they are “above” because of the choice they made to teach in Summerland.</i>
11	Speaker 4: “All we do is push, push, push, and really we’re not teaching them lessons. We’re not teaching them lessons. Speaker 3: And then some kids are doing everything all right, so it changes. . . Speaker 3: I know, it’s like, I remember when I first started teaching about, or learning about Geoffrey Canada and his “Harlem’s Children Zone.” They have this holistic you know. . . sources, these sources for parents and psychiatric, they’ve got a doctor, and all this stuff. And it’s like, ‘That’d be so amazing.’ Speaker 3: But no, it’s not going to happen. Speaker 4: Right, right. Speaker 3: It’s true, it’s true. It’s all about following. . . following the script, while you pace. ‘Oh I don’t agree with that.’ But then don’t tell them. . . don’t tell them about the issues you have in the class.”	<i>Teachers reference broader issues related to how hard it is to be heard in the district and the challenges of their experience with the curriculum as scripted. It does not allow the important work that needs to be done with students. The larger work they speak of is to wish for accommodations for whole child issues (psychological supports, nutritional supports, medical care, etc.).</i>

(Continued)

Table 7. Continued

Conversation Segment #	Speakers and Utterances	Analysis
12	Speaker 2: “Or it needs to be a district wide like...you know...” Speaker 4: and all the teachers need to be on the same page. Speaker 2: And then part of the problem with Rosa was when she was on an IEP, so she had some learning disorders... Speaker 4: But there again, that’s the other issue to treat someone differently, you know. That she can’t do... Speaker 2: So she was ELL and special needs, which is like that’s...a lot. Speaker 3: Yeah. Speaker 2: So she was probably a phase one, ELL, with a learning disability. Speaker 4: About differences... Speaker 2: Yeah. Speaker 4: About differences. About becoming not just... Speaker 4: We can take cultural, we can say ‘ability.’ Yes, so differences, so the acceptance is important.”	<i>We end back again at assumptions around what level English language skill Rosa is considered. In the last sentence, the volley back and forth between champion statements and biased statements is laid bare. The participant equates “cultural” and “ability” while acknowledging accepting each other’s differences is important and ultimately teaching kids to appreciate differences is a goal. This ending to their discussion represents a reversion back to the initial response to the case study as simply being a matter of kindness and empathy for all, across all differences without accounting for those differences with both tragic, profound historical roots and tragic, profound relevance still.</i>

turns from this specific case study to a critical lens on institutions and systems that allow for the cycling in of new teacher cohorts who tend to operate on principles of colorblindness and meritocracy as regards equity, thereby falling into the racial liberalism category. These teachers, in their mind, will likely avoid and resist conversations on race and neither the district nor other systems will identify this as problematic and work to break this cycle of colorblind, mostly White women teachers, replacing previous cohorts of colorblind, mostly White women teachers.

Importantly, this section ends (segment 12) with the teacher champions, who have demonstrated leadership in moving towards racial literacy, falling into a discussion of “... the problem with Rosa” and the reduction of racial differences to a generalized notion of difference. This generalization is a further example of contradiction. While the teachers have, for the most part, been able to clearly discuss race, not shy away from it and continually engage and challenge one another, at the end of the conversation, racial difference is generalized and thereby made less significant as it is made similar to other types of “difference.”

In summary, the conversation detailed in Tables 3–7 begins with the case study itself and a focus on the ways in which, either individually or as a class, the issues of kindness and empathy need to be addressed. The conversation evolves to frame the incident as one in which power and racism are implicated. As the teachers continue their dialogue, they talk about the way in which the gap in understanding between teachers and the students in the district is unacceptable. They highlight their empathy for students who experience prejudice and indicate their own working-class backgrounds provide them a window of insight into hardship and bias. They cite their collegiate experiences where they were exposed to people with more wealth and became self-aware of class privilege. Following this, they simultaneously defend against deficit-oriented perspectives by teachers towards parents in the district while engaging in deficit-oriented perspectives themselves. They end with a lengthy exchange that indicates their attention is being drawn to systems and institution-level analysis. This last segment of their discourse focuses on resources and the

ways in which the district has to implement system-wide professional development but also on the ways in which individuals in the district need to engage in honest reflection. In the very end of the last segment, despite all the varied discussion of the case study, the teachers return to a discussion of generalized difference. In Tables 3–7, we see how teachers respect each other and listen, share, and learn with and from each other that is distinctly impactful. We see this in both the individual remarks reported in Table 2 and the small group dialogue reported in Tables 3–7.

In Table 8, we focus our analysis on the closing whole group share-out in which the participants were asked to share their key takeaways. After several groups shared that their key takeaway was teaching kindness and empathy, one group acknowledges they, too, discussed the need for empathy but hone in immediately and directly on sensitive issues of race and the problem of the demographic mismatch between teachers and students.

In Table 8, we see one teacher who clearly steps into a leadership role concerning racial literacy. This teacher calls attention to the fact that White teachers must confront white skin privilege if they are to truly work towards equity in their classrooms. Further, the teacher notes that many people do not want to do that because it is painful. Meanwhile, a second teacher emphasizes the overall stereotypes at play when it comes to computer science and notes that Mary may be responding to the overall stereotype when referencing Rosa's ability. The teacher then goes on to note that it is up to teachers to debunk the stereotype for their students.

These results in Tables 3–8 reflect how some teachers are advancing anti-racist thinking in their full complexities, including imperfect assumptions and biases woven into the on-the-ground realities of teaching in practice. We would be well served to capitalize on these teachers' efforts, their understanding of their school institutions and personnel. These teacher champions may be a crucial linchpin in the quest towards anti-racist pedagogy and schools.

5.3 Evaluative Survey Results

The evaluative survey was conducted on the last professional development session of the series towards the end of the school year. The survey consisted of 15 questions that sought feedback from the teachers on their overall experience of our professional development series and ways that the series could be improved. Two of the questions focused on the equity segments of the professional development work. The two equity-related questions that were asked are as follows: (1) Were the equity case study activities presented in the professional development sessions useful to you? (2) Please explain your above answer in greater detail. A total of 21 teachers attended the final professional development workshop. Of the 21 responses to the first question, 8 teachers responded "Maybe" and 13 teachers responded "Yes." No teacher felt that the equity training was not useful to them. In Table 9, we provide representative responses from those who answered "Maybe" and "Yes" to question one. While we were not able to follow teachers into the classroom to observe any pedagogical changes they may have made in their teaching due to the training, these survey responses are helpful in understanding how teachers thought about the training over time.

Thirteen of the teachers who responded to this evaluative survey found the equity training to be useful. The training was useful in helping teachers think more about equity in their classrooms, some in relation to CS for All and some more broadly in relation to a child's overall educational experience. Importantly, teachers indicated that the training helped them to think from a different perspective about their classrooms. Arguably, this is the goal of the case studies themselves, to problematize certain classroom situations from the standpoint of race consciousness. As can be seen in those who replied "Maybe," such problems are difficult to approach (three people could not even remember the case studies) or they raised colorblind responses. However, three of the teachers who replied "Maybe" also discussed the notion of seeing their classroom from a different

Table 8. Teacher Leadership on Racial Literacy at the Whole Group Level

Conversation Segment #	Speakers and Utterances	Analysis
13	“Speaker 2: We thought very differently from everybody that’s spoken so far...there needs to be some serious intervention with appreciation, empathy, all of those kinds of things. But that there needs to be continued learning for students and teachers. In Summerland, we’re all white women teaching students in our classrooms that are 90, 80 what, 80% of our student population and not being connected to that or super hypersensitive and aware of that is I think a big problem. We think.	<i>Teacher participant speaks after several groups before her have shared-out that their key take-away was teaching kindness and empathy. She immediately marks that her group thought differently than the others in that though she appreciates the need for kindness there also has to be a reckoning with the reality of being part of a predominantly White teaching force teaching predominantly non-White students.</i>
14	Workshop Facilitator: ... I felt like you did say something different, but you said some things the same. So empathy is very important and– Speaker 2: Perspective taking. Workshop Facilitator: Perspective taking which a few friends say. Speaker 2: Acknowledging differences. Workshop Facilitator: Acknowledging differences.”	<i>Here, the workshop facilitator wants to help others see this view of a need to reckon with race as a part of their work and journey as well. By positioning this group on their own island of thought that is made more difficult. Therefore, she first acknowledges that Speaker 2 had a shared foundational view regarding empathy, but that now she was taking it a step further in hopes of creating bridges for other teachers to see themselves as crossing into the critical space of race and not just kindness.</i>
15	“Speaker 2: I think it’s something no one wants to talk about, and it’s very regarding privilege. If you mentioned white privilege that there’s huge defensiveness, and where people haven’t had an opportunity to learn about their white privilege, or it’s like that white fragility. It’s like, ‘Oh, I’m not a racist.’ I see that is, it’s stagnant. There’s not any opportunity to even grow because no one wants to talk about it ‘cause it’s painful.”	<i>Speaker 2 demonstrates leadership in making a bold, clear statement about her perspectives on Whiteness that in some ways gets to the heart of the White avoidance and resistance to talking about race.</i>
16	“Speaker 3: I just want to point out that we do have ... We’re trying to recruit more people of color, even if we’re not of color ourselves, you can be an ally. ...”	<i>There is an acknowledgment that diversifying the teaching force is of value, but the responsibility of White teachers is not absolved by taking this stance, as there is still work to do as an ally.</i>
17	“Speaker 5: the whole idea of this initiative is CS for all...of providing students with the understanding that computer science and science in general can really reflect it’s not just the nerdy white guy in a coat. It’s the computer science, which may be the representation that a student like Mary has. Maybe that’s what scientific is or that role of science is, so giving an entire class the chance to look at people who represents internationally that computer scientists and scientists come from all walks of life. They have all different things to share. The way they approach that field can be really useful too for them to see how computer scientists from different places around the world can create real-world problems that solve something for their particular population of people, so there’s a great opportunity to keep listening with that perspective, kind of extend it just beyond classroom, or their neighborhood, or zone, the city, or whatever.”	<i>Speaker 5 integrates content and identity in this comment, helping frame the case study as not just about Mary but about helping all students understand that all kids, from all over the world, do computer science.</i>

Table 9. Evaluative Survey Open-ended Responses on Usefulness of Equity Training

Response Question 1 (was equity training useful?)	Representative Response Question 2 (Explain your answer).	Analysis
Maybe	"I feel like as a professional we shouldn't be seeing or using our kids' differences against them in any way. I teach special education so for me I never want anyone to treat my own students with disrespect or like they can't be successful in anything."	<i>While this teacher responded that the equity training may have been useful, it appears that her view is a colorblind view in which all students should be seen and treated the same.</i>
Maybe	"Had a hard time relating them to the content and specific kids we are teaching."	<i>This response refers directly to the CS content. In both cases the child's ability to "do" CS was called into question. However, the ability piece is implied rather than explicitly stated, which may have made it challenging for teachers to connect the case study material to the CS content.</i>
Maybe	"Truly that was so long ago, I don't really remember what the case studies were about."	<i>Three of the eight teachers who selected "Maybe" as an answer reported that they did not really remember the case studies very well.</i>
Maybe	"The equity case studies allowed me to continue to make sure I am treating all students fairly in my class."	<i>Three of the eight teachers who selected "Maybe" as an answer reported a similar sentiment concerning thinking about their students and how to respond to them.</i>
Yes	"I like that going over these showed how we need to have equity in mind while teaching these lessons."	<i>Three of the thirteen teachers who replied "Yes" to the usefulness of the equity training referred specifically to these lessons and/or CS for All - seeing equity as an important aspect of this work.</i>
Yes	"I feel it is always important to use thoughtful, equitable language and communications. The case studies helped to evolve my thinking, as well as the thinking of others."	<i>This teacher places the CS for All equity training in a broader context of all education, emphasizing the fact that equity always matters and there is always room for growth where equity is concerned.</i>
Yes	"It gave me a better understanding of how you can teach something that is new to you / that you are not an expert at... It was very eye opening."	<i>This teacher is connecting CS to equity in a different way. Focusing on equity in the teaching of the topic appears to be a new idea.</i>
Yes	"I like reading and responding to the different situations given to us. It allowed me to gain a better perspective of equity."	<i>Three of the thirteen teachers who replied "Yes" to the usefulness of the equity training referred specifically to the idea of gaining a new or different perspective.</i>
Yes	"Being able to discuss with our colleagues was beneficial; asking them how they modified, failed, or succeeded in a module was helpful moving forward."	<i>This teacher emphasizes collaboration with other teachers in thinking about how to do the CS for All work.</i>

perspective. We cannot know if or how the case study experiences changed teachers' pedagogy in the classroom. However, we can see that, for the majority of teachers, the experience led to deeper engagement with the notion of equity in the CS for All context and their classrooms overall.

6 DISCUSSION

We sought to understand how teachers took up racialized incidents that occurred in local classrooms during the teaching of integrated CS content. We asked teachers to engage with the equity-based, case study vignettes to more deeply understand teachers' viewpoints about the role of race in teaching and learning in CS.

The main results derived from our case study vignettes research are consistent with the findings of other studies focusing on White teachers working with students of color. Indeed, several of the statements made by teachers in our study are aligned with Milner's [2012] cultural practices that contribute to the opportunity gap for students of color. These cultural practices include colorblindness, deficit mindsets, the myth of meritocracy, and a focus on individualism. In our data analysis, we saw clear examples of teachers who continue to hold a racially liberal viewpoint that deny the ongoing impact of structural racism while also claiming to see all people as equally capable. In our data, the individualistic viewpoint is captured in colorblind and meritocratic comments, as well as comments that belied implicit bias towards students of color. Moreover, in line with the research of Goode et al. [2020], we found evidence of teacher avoidance and distraction when it came time to talk about race, which McIntyre [1997] has identified as elements of "white talk." Also, in accordance with the prior research of Epstein (2019), we identified White teachers who are moving in the direction of greater race consciousness, as well as teachers whom we see as champions in the discussion of race in the school district. Teachers who are closer to the racial literacy end of the continuum expressed a deeper understanding of the role of structural racism in the lives of students of color.

While our primary results are consistent with prior research, we argue that a major contribution of our work regards the efficacy of our case study approach, both in terms of case study design and case study learning activity design; we discuss each in turn. The case study design embedded two qualities that supported teacher reflection as follows: (1) the case studies were created from observed interactions during CS for All lessons in Summerland classrooms; (2) the case studies were anonymized. Because the case studies were created from observations in the Summerland schools, teachers were presented with a unique opportunity to recognize the interactions as authentic and meaningful to them. This interpretation is supported by comments made in the small group dialogue reported in Tables 3–7. Throughout the conversation, the teachers refer to Summerland students, families, and district policies in discussing the case. By including authentic, local details in the vignette, the teachers were quickly able to contextualize it, see their own classrooms and students in the case, and talk about it from lived experience. At the same time, the fact that the case studies are taken from anonymous classrooms provides emotional distance for the teachers. The case studies are not about their individual classrooms; therefore, teachers were not in the position where they felt the need to defend themselves. This emotional distance allows for reflection and can mitigate engagement in "white talk." Again, the small group conversation supports this finding, as the teachers in that group were able to continually engage the issue of racism that is raised in the second case study.

Meanwhile, it was the case study learning activity in the PD sessions itself that helped us to not only learn more about teacher stances but also to support teachers' meaning-making discussions regarding issues of racial equity in the CS for All context. Our learning activity design included personal written reflection on the case studies, followed by small group dialogues, and finally whole group share-outs.

As we have seen through the small group dialogue presented in Tables 3–7, teacher-only dialogue spaces allowed people to speak freely with one another while working towards greater meaning making about equity in the classroom. The teachers in the small group discussion engaged in dialogue that included a focus on intersectionality (segment #'s 5 and 6), a critical view of some of the teachers in Summerland vis-a-vis race (segment #'s 5 and 9), and, significantly, the role of the district in promulgating structural racism (segment #'s 4, 10, and 11). It is our view that teachers have more sway with one another than do outside voices; when teachers share critical viewpoints, the details of the critique are recognizable and, therefore, supportive of their trustworthiness and validity. For example, in segment five, speaker four laments the fact that Summerland teachers are not being taught how to address race-based issues among students as they come up in the classroom. This comment is affirmed by speaker two who agrees. These types of insights are extraordinarily important both for teacher learning within the small group and also for research partners and district personnel in a research practice partnership where the goal is equitable CS learning experiences for children.

Another valuable aspect of the teacher-only small group dialogue spaces is that they make room for the surfacing and expression of the complexity of teachers' views about structural racism and students. Table 2 provides a clear picture of one teachers' contradictory views expressed during the course of the small group conversation. In this table, we see how the teacher holds a mix of both asset and deficit views of the student Rosa and her Puerto Rican background. The teacher makes some assumptions about the knowledge that Rosa might have in coming from Puerto Rico (e.g., potentially knowledge of plants). We ask if this teacher would make similar assumptions about an ELL student who had recently arrived from a European country, for example, France or Germany? Despite this assumption, we also see this teacher has an asset view of Rosa by indicating that even though Rosa is quiet, it does not mean she does not know much; these two attributes are not comparable.

This teacher was not alone, in that it is possible to see evidence of contradictory statements throughout the reported small group dialogue. This was particularly true regarding contradictory and conflicting views of students' parents and families. For example, in segments six and seven, the teachers both defend students' parents from others' general critiques (they do not care) and in the next breath display a deficit perspective about them (they are not educated; they are not literate; the kids do not know anything). Generally speaking, the teachers recorded in this dialogue fall more to the racial literacy side of the continuum—as evidenced by discussions of structural racism—however, their conversation makes clear that there remains room for growth in terms of racial literacy. This is not a surprising finding, in that the development of knowledge in any area will, necessarily, reflect partial understandings and misconceptions along the way. And this may be especially true when one must unlearn a mindset (e.g., White supremacy) to develop knowledge in the new area (racial literacy).

The whole group share-out element of the case study learning activity is also very important. The whole group share-out provided teachers the opportunity to show leadership in their views of equity in the classroom. Indeed, the individual teacher whose comments we highlighted in Table 8 made a few whole group comments that named specific issues of import for Summerland teachers, including the fact that most of the teachers are White and most of the students are either Black or Latinx. Moreover, she highlighted that it is the pain associated with acknowledging the role of white privilege in the promulgation of educational inequity that stops the White teachers from directly confronting racism. This comment was powerful, and the teacher stepped into a leadership position within the whole group when she expressed this idea. Therefore, all three of the elements of the learning activity design are important and useful, though we also recognize that a given teacher must be both on the racial literacy side of the continuum and feel confident enough to

raise a clear issue with the rest of the group for this type of outcome to occur. In other words, the whole group share-out element itself is a necessary but not sufficient element for teacher leadership around issues of equity to emerge.

It is critical that CS for All researchers consider how to do equity work with teachers from a larger perspective. While it is important to emphasize that all students are capable of learning computer science, and that all students have the opportunity to engage in meaningful CS learning, we argue that it is not possible to bring about necessary changes without helping teachers to do deep anti-racist work in which the sociopolitical, historical roots of racism and their cultural manifestations (defined by Milner [2012] as detrimental educational practices) are discussed from a racial literacy framework. Importantly, this is ongoing work. In our research practice partnership, all of our professional development workshops include equity work. Here, we report on our case study approach, one of several approaches we are using in an ongoing setting. The district of Summerland is deeply committed to the goals of CS for All and working to help teachers reflect upon and begin to grapple with where and how issues of equity enter into the CS classroom and the classroom writ large is emblematic of that commitment. As we see from Wang et al. [2017], student/parent/administrator surveys results and the work of Cheryan [2013] there is much cultural bias related to who can or would do computer science. This type of cultural bias is strongly related to deficit thinking—implying that those who would not do computer science are those who cannot do it. While deficit thinking is certainly an aspect of some of the Summerland teachers' viewpoint, we argue that it is less of an aspect directly related to computer science, this is so because the teachers who are taking part in our CS for All project are doing so because they implicitly believe they can teach computer science and their students can learn it. Therefore, in the CS for All setting, what is most important in equity training is helping teachers to gain new perspectives on equity and how it may play out in the classroom in terms of becoming more aware of where and how race enters. We can see from our teacher survey responses (Table 9) that teachers were appreciative of gaining new perspectives—this is a start.

6.1 Future Research

The complexity and contradictory nature of teacher viewpoints demonstrates the need for PD that is able to address specific, pernicious viewpoints, such as deficit thinking. Given the range of views expressed in our dataset (from closer to the racial liberalism view, to more of a midpoint, and finally to teacher champions), we suggest that differentiated equity-based PD may be useful. Future research should seek to investigate the efficacy of targeting specific content for specific groups. For example, teachers who express views that are closer to racial liberalism may be well served by curriculum that has a stronger focus on the history of racialized minorities in the US, whereas those who are more at the mid-point may find work on deficit thinking helpful, while teacher champions may be interested in delving more deeply into understanding manifestations of racism in CS educational policies and practices including how to collectively combat these practices.

Moreover, future research should investigate forms of participation, approaches to facilitation, and material resources that are most useful in supporting differentiated learning. We argue that anonymous, authentic case study vignettes (those drawn from the teachers' own district), coupled with opportunities for written reflection, teacher-only small group dialogues, and whole group share-outs are important aspects of supporting meaning making—we believe other designs also hold promise. In our view, providing leadership roles to teacher champions will go a long way towards supporting teacher learning about equity in CS education. This is so because teacher champions are able to do work with other teachers that a research team cannot. The teacher champion shares lived experience with other teachers and, therefore, has particular credibility when it comes to discussing teaching, learning, and students in the local context. The advantage of the research

practice partnership formation is that researchers come to know teachers and district personnel overtime, and so the identification of teacher leaders is a realizable goal. For researchers not engaged in RPP work, it is still possible to identify teacher equity champions through research participant recruitment that makes clear goals of equity framed from a critical lens. Such recruitment would appeal to teachers who have already developed a critical, justice-oriented lens on racial equity in education.

7 CONCLUSION

Teachers, and particularly White teachers, can benefit from explicit grounding of CS PD in an anti-white-supremacy, anti-racist strategy that helps them develop an awareness of racial literacy. This awareness may serve as a starting point for examining their racial lens on students, pedagogy, and ideas of meritocracy, colorblindness, and equity. Racial liberalism is a strong orientation of many well-intentioned White teachers, such that these same teachers, even when becoming cognizant of a need to do their work to make progress in their racial thinking, may not know where or how to begin. Teacher CS PD that is explicit in complicating the historical understanding of racism as an aberrant element of the American story may help teachers move in the direction of racial literacy. Differentiated, equity-based CS PD should be an ongoing feature of CS for All initiatives, including RPPs. For White people, equity work is lifelong work—there is no end point, only learning along the way.

A APPENDICES

A.1 Case Study #1

Ms. Smith, a White teacher, facilitates a CS activity in her class where children work in small groups to program the beebot to follow a grid drawn on a poster board. Ms. Smith decides to work closely with a group of children she feels can do more; this group works on debugging errors on a grid that requires them to move cards, one at a time. Ms. Smith makes sure that Jasmine, a Black student in the class who is very friendly, outgoing, and boisterous, works in this group. Ms. Smith has Jasmine work with this group not because she thinks Jasmine is on the same level as the other students, but because she is worried that Jasmine will disrupt others in an unsupervised group with her boisterousness, so she wants to keep her nearby.

When it is Jasmine's turn to move a card in the game, she moves two at a time, violating a rule of the game. Ms. Smith does not notice this at first, and it ends up throwing the game off for the group. This happens towards the end of class, so Ms. Smith ends the game there and calls all of the students back together to discuss the activity. Ms. Smith decides to reinforce the importance of following instructions in class by pointing out Jasmine's error to the other students. At this point, Jasmine has left the classroom to use the restroom. While she is gone, Ms. Smith says to the students "Make sure you follow directions, because if you don't, you can ruin the game, like Jasmine did."

- (1) What are some of the things that you notice about this scenario? (list observations in the space below).
- (2) What are some things you wonder about this scenario? (list your questions in the space below).

A.2 Case Study #2

Ms. Simon's Dilemma – Part 1

Ms. Simon is a White fifth-grade teacher who speaks English only. Her students are primarily Latinx, but she also has Black and White students in the class. She has one student in her class

named Rosa who recently moved to the mainland US from Puerto Rico. Rosa's first language is Spanish and she is learning how to speak English in school.

Ms. Simon is teaching her students an integrated science and computational thinking lesson focused on creating a game-type program in Scratch that animates the life cycle of a plant and examines how various weather conditions (too much water, not enough water, too much sun, not enough sun) affect plant growth. Rosa who has an IEP is often pulled out of the classroom for one-to-one instruction. On this day, Rosa returns to the classroom after the group has received instruction related to programming in Scratch. Ms. Simon has assigned Rosa to sit with the same group of girls when she returns from one-to-one instruction, there are three girls, Mary who is White, and Nalia and Ivelisse who are both Latina. These girls are pleasant and don't mind trying to help Rosa catch up with what she missed while out of the classroom. Nalia is fluent in Spanish and often speaks to Rosa in Spanish.

Programming the Scratch animation is a challenging activity, and the group is struggling a little. At one point, while Ms. Simon is nearby helping other students, she overhears Mary say to the other girls in the group about Rosa "she doesn't know much, she's Spanish."

How should Ms. Simon handle this situation?

(Use the below space and the back of this page to write your response).

Ms. Simon's Dilemma – Part 2

Ms. Simon later relayed the incident to two trusted colleagues who also teach at the school. They had different reactions. One felt race was relevant to the situation while the other thought race did not matter.

What do you think the reasoning is for each colleagues' point of view?

(Use the below space to write your response).

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