**ORIGINAL PAPER**

# A case study of whiteness at work in an elementary classroom

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## Abstract

We are interested in how whiteness shaped one teacher's abilities to engage his elementary school students in culturally responsive pedagogy, especially his abilities to engage or avoid conversations about race-based inequities in an integrated technology unit focused on NGSS disciplinary practices. We draw upon culturally responsive pedagogy, critical race theory, and critical whiteness studies to understand the role of whiteness in a single case study of integrated elementary science teaching leveraging electronic textiles technology. The case study reported here is part of a larger study investigating how technology integration supports justice-centered science learning for elementary school teachers and their students in the Intermountain Region of the USA. The authors are white and Latino and all, but one, are former classroom teachers. Drawing on multiple data sources (field notes of classroom observations, interviews, transcripts of video-recorded classroom sessions), we developed a single descriptive case to illustrate shifts in teacher practice over time. We documented one white, male, fifth grade teacher's engagements with his students around issues of race as manifested in conversations about immigration, migration, and forced relocation in an integrated technology unit focused on NGSS disciplinary practices. This single case and the teacher perspectives it illustrates are resonant not only of our data but also the scholarly literature on white pre- and in-service teachers in the USA. We conclude with some practical recommendations for teacher professional development.

**Keywords** Whiteness · Teacher professional development · Technology integration

Most educators in the USA are white, but increasingly their students are not. While urban education has long been concerned with the disconnect between white teachers and their students of color, this is also becoming an issue in rural America as demographics shift. Across the board, teachers are woefully underprepared to teach across difference (Banks 1993). Most teachers take only one multicultural education course during their degree

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program (Villegas and Lucas 2002), and this is not sufficient. One way to remedy teachers' lack of preparation in culturally relevant teaching is to provide professional development for in-service teachers. In this article, we focus on the experiences of one white, male teacher in attending professional development and implementing an integrated technology unit. We are specifically interested in how whiteness shaped the teacher's abilities to engage his elementary school students in culturally responsive pedagogy during the implementation of the unit, which utilized project-based learning with electronic textiles to cross-disciplinary boundaries, centering themes of immigration, migration, and forced relocation across science, social studies, language arts, and math in the upper elementary grades. Our inquiry was guided by the following research question: What role does whiteness play in one teacher's implementation of an integrated technology unit focused on NGSS disciplinary practices?

## Why whiteness?

We view whiteness as central to how white teachers engage their students in talking about topics where race is central to the conversation, such as immigration, migration, and forced relocation. As such, we frame our inquiry in terms of race. Critical race theory (CRT) is centered upon the understanding that racism is at the heart of US society and its institutions (Delgado 1995). While most educators are well intentioned, the educational system in the USA, and indeed our society as a whole, is inequitably structured and rooted in racism and white supremacy, which is maintained through the practice of whiteness. By whiteness, we refer to the ever-shifting ways in which society and its institutions are inequitably structured such that white people enjoy unwarranted privileges within US society and the ways in which what is deemed good and right are measured against a white standard. As Angelina Castagno (2014) notes, "Whiteness maintains power and privilege by perpetuating and legitimating the status quo while simultaneously maintaining a veneer of neutrality, equality, and compassion" (p. 5). Cheryl I. Harris (1993) observed that whiteness is constructed legally through aspects of identity, privilege, and property and argued that white status provides individuals unique property rights which are unavailable to People of Color and subsequently renders whiteness valuable. Whiteness may be deployed through one of these vehicles individually or at times in tandem. White people possess and benefit from whiteness, which affords them power and privileges based on their race. As such, white people are deeply invested in maintaining the system of White Supremacy insofar as it maintains privileges to which they are accustomed (Lipsitz 1998).

Because whiteness is pervasive in our society, white people are often unaware of their role in perpetuating whiteness. In the context of teacher education, Joyce King (1991) uses the term dysconscious racism to reflect "the limited and distorted understandings [her] students have about inequity and cultural diversity—understandings that make it difficult for them to act in favor of truly equitable education" (pp. 133–134). Similarly, Joe Kincheloe and Shirley Steinberg (1997) observed that their participants lacked awareness of their own racial identities, allowing them to deny their racial privileges and their membership in the dominant group. In classrooms, as Irene Yoon (2012) has studied, most teachers reproduce inequity daily, whether they intend to or not because of the distorted ways in which they think about race and whiteness (King 1991).

Over time, whites' distorted ways of thinking about race and whiteness become instantiated as white common sense. In other words, white ways of knowing about race become

seen as normal or expected within society (Leonardo 2009), and alternate perspectives are perceived as militant, unacceptable, or incorrect. When faced with information that challenges white common sense, whites frequently display emotional responses, including revulsion, pity, guilt, anger, and defensiveness (Leonardo and Zembylas 2013). Further, Cheryl Matias and Michalinos Zembylas (2014) have argued that, within educational contexts, teachers may also react to information that challenges their white common sense with displays of caring or sympathy (e.g., noting that a lesson particularly helped their students from "rougher backgrounds"). Such displays of emotion ultimately provide whites a way to articulate their racist beliefs using language that is deemed acceptable for teachers (e.g., low socioeconomic status, English Language Learner). Further, these displays of emotion are meaningless because they are not backed up by actions that demonstrate care and move to alleviate suffering (Matias and Zembylas 2014).

## How whiteness operates in classrooms

According to Gloria Ladson-Billings (1998) propagating inequity in the classroom begins with the notion that instruction is "a generic set of teaching skills that should work for all students" (p. 19). There are no generic teaching skills; pedagogies are systematized, organized, and institutionalized practices designed to support the development of normative classroom cultures. However, when the term "normal" is used in classrooms around the USA it is coded language for white. Classrooms and schools operate in ways that enable and perpetuate power structures rooted in whiteness (Scott 2006). Thus, teacher preparation programs prepare pre-service teachers to engage white students in their classrooms and not all students. As Christine Sleeter (2017) observes, these white educators receive little to no preparation in how to engage with students from cultural and linguistic backgrounds different from their own, despite decades of research showing the benefits of leveraging the cultural, interactional, and linguistic resources students bring to school with them. Further, Ladson-Billings reminds us that "when generic teaching strategies taught in pre-service teacher education programs throughout the country fail to obtain the desired results, the students, not the techniques are found to be lacking" (1998, p. 19). Such deficit discourses locate the source of the problem in students and their families rather than in the very structure of our society, which routinely fails students of color. To ignore this disconnect between teaching methods and student achievement within an inequitable system at a time when our schools are growing increasingly more diverse (NCES 2020) is to ensure that the US educational system continues to fail students who are racially, ethnically, culturally, and linguistically diverse.

Perhaps even more troubling is that white teachers who want to engage in equity-oriented teaching practices, such as culturally responsive pedagogy, often unknowingly reinforce whiteness. As conceptualized in the research literature, culturally responsive pedagogy involves engaging students in learning experiences that "make sense" to them from a cultural standpoint (Klug and Whitfield 2003) and recognizes the rich resources for learning students bring to school with them (González, Moll and Amanti 2005) but also encompasses critical thinking on the part of teacher and students about complex social issues, as well as high academic expectations. In practice, however, meaningful engagement with the inequities of US society is often ignored in favor of comfortable "celebrations of diversity" (Ladson-Billings 1995). If teachers are willing to go beyond the heroes, holidays, and foods approach to "equity" teaching, they often ignore structural forms of oppression and

rather choose the "few bad apples" approach, instead of positioning racism and other forms of oppression as isolated incidents (Thompson 1997). Culturally responsive pedagogy can be especially challenging in science, technology, engineering, and mathematics (STEM) because these disciplines "are often viewed as being objective and devoid of connections to culture" (Mensah 2021, p. 3). Thus, culturally responsive pedagogy is often problematically claimed, inaccurately deployed, and therefore marginalized in schools and pre-service teacher preparation programs (Castagno 2014).

## Whitestream curriculum

In US schools, the curriculum is often referred to as whitestream and privileges the experiences of whites in the USA. As Luis Urrieta (2004) notes, the whitestream curriculum portrays non-white cultures and actors as less valuable, asserts assimilation and silence as necessary for persons and students of color, promotes white savior interpretations of the past and present, and is grounded in white supremacist notions of the meritocracy. Gloria Ladson-Billings and William Tate (1995) applied Cheryl Harris' (1993) construct of whiteness as property to make sense of how the whitestream curriculum privileges white students and white ways of knowing. The curriculum is an iteration of intellectual property that has been maintained and controlled to protect the presence of whiteness in schools (Bullock 2017). When curriculum materials centralize whiteness, students of color are assessed through white norms and cultural practices. For instance, Bryan McKinley Jones Brayboy and Emma Maughan (2009) document how Indigenous pre-service teachers were assessed by their site teacher educators as lacking prior to a specific conversation about redesigning an elementary science lesson through the lens of Indigenous knowledge. Therefore, whiteness is a property right by which students of color are judged but to which they do not have access. Additionally, white students perceive value in their whiteness and subsequently internalize dehumanizing beliefs about people of color. Through the whitestream curriculum, white students maintain their investment in their white property (Urrieta 2004). Conversely, students of color are taught there is little property value associated with their histories, identities, or stories. For teachers, this property right is reflected through the ability to make curricular decisions as they see fit while maintaining a position unwilling to question the whiteness present within content standards, course materials, lessons plans, or textbooks (Brown and Brown 2010).

## Shifting teacher attitudes and beliefs: not that easy

Culturally responsive pedagogy is a response to deficit views of students of color and their families that emphasizes the rich linguistic and cultural resources students bring to school with them. By teaching students in ways that make sense to them, educational outcomes are (ideally) improved upon (Gay 2013). Across proponents of culturally responsive pedagogy, several themes are apparent: (1) students must be supported in maintaining or revitalizing knowledge and practices associated with their cultural heritages, (2) students must succeed academically, and (3) students must develop their abilities to critique and challenge the status quo. As Geneva Gay points out, culturally responsive pedagogy is "at once a routine and a radical proposal" (p. 26). It is routine in that it demands that we provide all children in the US educational system with the opportunities afforded white, middle-class children

to experience schooling in a way that makes sense linguistically and culturally. It is radical in that it acknowledges the inequity inherent in our educational systems. To be prepared for culturally responsive teaching, Gay outlines four principles for teachers. First, teachers must shift their attitudes and beliefs about students of color, their families, and communities from a deficit perspective to a generative perspective that recognizes the "power, potential, creativity, imagination, ingenuity, resourcefulness, accomplishment, and resilience among marginalized populations" (p. 54). Second, teachers need to understand and challenge the resistance to culturally responsive teaching. Third, teachers must understand culture and difference as foundational to culturally responsive teaching. Fourth, teachers must find examples from the local sociocultural context that are pedagogically meaningful.

While this is essential work, scholarship in critical race theory and critical whiteness studies makes clear that teachers cannot fundamentally shift their attitudes and beliefs about students without first interrogating their own racial identities. Research on white teacher identity studies focuses on preparing white teachers to "critically [confront] historically institutionalized racial inequities, racism, and whiteness in preparing white teachers for work in increasingly diverse schools" (Jupp Berry and Lensmire 2016, p. 1152). This work is an important step toward equity in classrooms because teachers who do not recognize their own privilege and the ways whiteness operates are likely to act in ways that are harmful to students of color (Matias 2013). Examining eight white, pre-service teachers, Bree Picower (2009) found that the pre-service teachers actively protected their white common sense which disavowed systemic racism when presented with challenges in their multicultural education course. Thus, more equitable teaching and learning environments begin with assisting white pre-service and practicing teachers in developing awareness of their own racial identities and understanding how their beliefs contribute to the perpetuation of the status quo. However, numerous studies have explored the challenges of getting white pre-service and practicing teachers to talk about race, whiteness, and their own privilege. For instance, Jacob Bennett (2019) spent 2 years meeting regularly with Ruth (a pseudonym), a white woman, as she transitioned from student teaching to her first year in the classroom. They met regularly to discuss Ruth's thinking about race. In their conversations, Ruth struggled to comprehend the systemic nature of racial oppression in the USA and said such conversations "'[made] her head hurt'" (Bennett 2019, p. 7). Similarly, Matias (2013) documented the colorblind ideology of one pre-service teacher who said, "Racism is not an issue for me. Therefore, I have a hard time saying that I am an anti-racist educator, meaning that I don't plan on going out of my way to show special treatment to students of color. Rather, I plan on treating them the same way I would treat any other student" (p. 75). In these examples, we see teachers enacting white emotionality in their refusal to seriously engage in conversations about their own racial identities and racial inequity within US educational systems and society as a whole. Much like the notion that "all lives matter," colorblindness is a refusal to engage with systemic racism and the privileges conferred by whiteness in US society. Further, for many white teachers, "white racial privilege may affect professional identity and beliefs in ways that present obstacles to transformative learning" (Yoon 2012, p. 588).

While some white teachers evade conversations about race, other white teachers are more aware of how race, power, and whiteness operate in an inequitably structured system. Researchers have documented both white teachers who are able to successfully teach across differences and white teachers who despite "professional teacher identities that by degree recognize race, class, culture, language and other differences in students and themselves and understood differences as having potentials for teaching and learning" (Jupp Berry and Lensmire 2016, p. 1168), often end up enacting whiteness. For instance, Irene Yoon (2012)

analyzed a study group of white elementary school teachers reading a book about teaching students of color. She found that because the group was comprised entirely of white teachers, opportunities for anti-racist work were limited. More specifically, "conversations were deracialized (the subject of a 'critical' conversation was shifted to allow for affirmation rather than critique); and white individuals compared their beliefs to those of other white individuals but shied away from taking personal responsibility for challenging problematic statements" (Yoon 2012, p. 607). In these ways, well-intentioned, equity-minded white teachers perpetuated and supported white privilege. Taken together, race-evasive and race-visible studies of white teacher identities highlight the complex and contradictory nature of racial identities. Rather than viewing white teacher identities as either race-evasive or race-conscious, we need to recognize that awareness of race and whiteness exists along a continuum. In this article, we examine one white elementary teacher's experiences attending professional development and implementing an integrated curriculum centered around issues of immigration, migration, and forced relocation. We are particularly interested in how whiteness shaped his ability to implement culturally responsive pedagogy. Our findings echo the existing literature on shifting white teacher beliefs and attitudes within the context of an integrated professional development and classroom implementation. However, they show that even teachers who do not shift their attitudes and beliefs can come to see the value of culturally responsive pedagogy for their students.

## Elementary STEM teaching integrating textiles and computing holistically (ESTITCH)

Project ESTITCH is a 2-year curriculum and professional development project serving 19 teachers and over 500 students across three rural and highly ruralized school districts in the Intermountain West. The majority of teachers participating in ESTITCH are white, though their students are more diverse. Across the districts participating in the study, approximately 30% of students are Latinx. Furthermore, elementary teachers are frequently nervous about engaging their students in complex social issues (Botelho and Rudman 2009), despite overwhelming evidence that elementary students want to have conversations about such topics (e.g., Hollingworth 2009). Project ESTITCH leverages the affordances of children's literature and technology integration to assist upper elementary teachers in implementing culturally responsive teaching, including having hard conversations with their students around the themes of immigration, migration, and forced relocation. Ideally, this work requires teachers to begin to think critically about whiteness and their privilege, though many teachers resisted and admitted being nervous about teaching what they saw as "difficult" content to their students.

ESTITCH focuses on the development of a curriculum (targeting students) and professional development to train teachers in the use of the curriculum. Projects are intended to align with a variety of core ideas from state, Common Core Mathematics (CC-M), and Next Generation Science Standards (NGSS) to preserve maximal flexibility to teachers' needs while also connecting to other content areas such as social studies and language arts (see Appendix 1: Standards Chart). This is particularly important since "teachers of content-specific courses, such as science and mathematics, feel they do not need to address diversity, equity, multiculturalism, or related the teaching of science to issues of race" (Mensah 2021, p. 3 citing Banks 2016). The integrated curricular approach taken by ESTITCH permits not only the development of materials useful to teachers at multiple

grade levels and obligated to standards that differ by state, but also provides more effective integration into teachers' normative practices by allowing them to identify specific areas where they feel their students might realize the greatest benefit from inquiry and design activities. Across all projects and implementation contexts, primary learning outcomes include principles of electricity and circuitry and basic computing skills related to microprocessor programming, in addition to the target curricular content emphasized by participating teachers. Three main projects comprise the hands-on aspect. ESTITCH leverages the affordances of electronic textiles (e-textiles) materials (Kafai, Fields and Searle 2014; Tofel-Grehl, Fields, Searle, Maahs-Fladung, Feldon, Gu and Sun 2017), which include copper tape, conductive thread, and a variety of sewable electronic components. They can be used to create circuits on paper or to embed them in fabric, opening up an array of possibilities for integrated elementary classroom projects. Importantly, students can personalize their projects through the choice of materials, content depicted, and programming. In ESTITCH, three e-textiles projects are included in the curriculum.

## The project timeline

Groups of students read and discuss a picture book on immigration, migration, or forced relocation. Students then work collaboratively to design, construct, and program a computational circuit timeline that showcases their book (see Fig. 1). To create their timeline, students use LED lights, copper tape, a battery, and a programmable microcontroller to create a circuit that can be programmed. Students then program the circuit so the LED lights blink in the order of events in their chosen picture book. In Fig. 1, the circuit is on the back of the paper and, therefore, not visible, but we can see three LED lights poking through the brown rope in the middle of the page. This project focuses on students' scientific understanding of basic circuitry and introduces programming.



**Fig. 1** A student-created paper circuit timeline based on *This is the rope: A story from the Great Migration* written by Jacqueline Woodson and illustrated by James Ransome

### The freedom quilt square project

The Freedom Quilt Square Project addresses the role of women in the fight for freedom and abolition through the Underground Railroad. Because women used quilt squares to send secret messages to slaves moving toward freedom, this project focuses on the National Curriculum Standards for Social Studies and addresses state standards around the use of maps and the identification of key ideas, events, and leaders of the Civil War using primary sources. Students are provided with a template for a quilt square pattern and are tasked with sewing that pattern and determining the message behind it. Students use e-textile materials to create a blinking quilt square that, when put together with other classmates' squares, form a larger quilt of textile messages used to provide safe passage on the Underground Railroad. This project provides students with an opportunity to become familiar with the intricacies of conductive sewing on a relatively simple project and provides more practice with programming. Each student square has one LED light, but students work collaboratively to connect their quilt squares to a microcontroller to program multiple lights to blink (Fig. 2).

### The meaningful moments quilt square

After learning about the pivotal ways in which immigration, migration, and forced relocation impacted communities throughout history, students share a meaningful moment from



**Fig. 2** Underground Railroad Quilt Squares created by a Portuguese immersion classroom

their history. These quilt squares focus on students' telling of their own stories using e-textiles materials (Fig. 3).

## The professional development model

The professional development workshop sought to engage teachers in three specific facets of work. First, we sought to ensure that teachers possessed or developed appropriate content knowledge and inquiry-focused pedagogical knowledge. In particular, we wanted to make sure teachers had appropriate content knowledge around electricity and circuits, as these are central to making functional e-textiles projects. Ensuring proper content knowledge for teachers is vital to effective classroom instruction for students (Windschitl 2004). Using the 5E instructional model (Bybee, McCrae and Laurie 2009), we modeled effective inquiry pedagogy during the professional development workshop and ensured participating teachers could map the target projects onto the engagement–exploration–explanation–elaboration–evaluation sequence to appropriately facilitate student participation. For the three days of the professional workshop, the teachers engaged in macro and micro versions of the 5E instructional model that they were expected to implement in their classrooms. Second, we educated teachers on the e-textiles projects, including conductive sewing and basic coding skills in the Microsoft MakeCode environment, such as working with variables, constructing conditional statements, looping, and use of functions, so they are capable and comfortable teaching the projects in their classrooms and linking them to the relevant science content standards for their state and grade level. Third, we engaged teachers in learning the social studies content, including how to have difficult conversations with students in grades 3–6.

More specifically, we informally assessed teachers' prior content knowledge and provided access-related content to ensure that all teachers had a shared foundation. We facilitated discussion of relevant social studies concepts (e.g., immigration, migration, forced relocation). Teachers were also asked to evaluate their understanding of these issues, acknowledge and reflect on their biases, and challenge deficit-centered myths associated



**Fig. 3** A classroom quilt of students' meaningful moment quilt squares

with immigration, migration, and forced relocation. Additionally, we shared and discussed recommendations for facilitating classroom dialogue about race/ism, complex social issues, identity, and difficult dialogues that were grounded in culturally responsive pedagogy. Facilitators revisited these concerns and recommendations with teachers as they engaged in projects and discussions throughout the week of professional development. To extend teachers' connection with the professional development beyond the 3 days, teachers were encouraged to read supplemental materials that were provided in advance of implementing the ESTITCH curriculum in their classrooms.

## Implementing the professional development project

To explore our research question about the role of whiteness in one teacher's implementation of the ESTITCH curriculum, we developed a single descriptive case of an in-service, white elementary school teacher. The teacher, Mr. Smith (a pseudonym), participated in a three-day professional development (22 h) intended to prepare him to teach the ESTITCH curriculum, which provided integrated lessons across science, social studies, language arts, and math centered around immigration, migration, and forced relocation. At the time of the study, Mr. Smith, a white male, was a fifth-grade teacher with 4 years of elementary teaching experience. As an elementary teacher, Mr. Smith was responsible for teaching his students math, language arts, social studies, and science. Like many elementary teachers, Mr. Smith did not feel comfortable teaching science (Mensah and Jackson 2018). Mr. Smith worked at Sunpeak Elementary School (a pseudonym) which serves approximately 400 students in grades K-5; the community population of Sunpeak Elementary is roughly 22% Latinx, which is three percent lower than the state average. While Mr. Smith's class was comprised primarily of white students, he did have several students of color in his classroom. As another teacher from Mr. Smith's school described, "We teach at the [district name] and I feel like it is very diverse. At [Sunpeak] we have a lot of families, students come from other countries, so we have a lot of diversity that way." We selected Mr. Smith for this study because he consistently resisted the content of the curriculum and professional development, and his actions were emblematic of many white elementary school teachers in our study. By studying a resistant teacher, we are able to better understand the deeply entrenched nature of whiteness and white supremacy and the amount of time required to shift teacher attitudes and beliefs. In addition, Mr. Smith represented a typical, science-averse elementary school teacher. Throughout professional development and classroom implementation, Mr. Smith repeatedly stressed his lack of confidence in the science content of ESTITCH. Delving into a single case allows us to explore what Mr. Smith says and does across the professional development and classroom implementation of ESTITCH.

## Collecting and analyzing data from the project

To develop a descriptive case study of Mr. Smith, we collected data before professional development, during professional development, during classroom implementation, and after classroom implementation. In the spring of 2019, we observed a single classroom session of Mr. Smith teaching, with a focus on how he integrated technology into his lessons. We video-recorded the classroom session and later transcribed it as a first level of analysis (Ochs 1979). A member of the research team also completed an

observation protocol and took field notes on the lesson. During professional development in the summer of 2019, we collected video and audio recordings of Mr. Smith's table, which were later transcribed. A member of the research team took written field notes about the activities at Mr. Smith's table and photographs documenting Mr. Smith's versions of the three ESTITCH projects described above (Emerson, Fretz and Shaw 1995). After professional development, Mr. Smith was interviewed by a member of the research team. This was audio-recorded and later transcribed. The post-professional development interview asked Mr. Smith to reflect on his overall impressions of the professional development and to share what his meaningful moment quilt square was and why he made that design.

In Fall 2019, Mr. Smith implemented the ESTITCH curriculum in his classroom. During this time, we visited his classroom 15 times for hour-long ESTITCH lessons. We video-recorded his classroom ESTITCH instruction, which was later transcribed, and completed an observation protocol and field notes for each day a member of the research team visited his classroom. We also documented student work through photographs. Finally, we conducted a post-implementation interview with Mr. Smith where we asked him to reflect on his experiences teaching ESTITCH, including how it caused him to reflect on his own identity and those of his students.

Because we were particularly interested in how whiteness shaped how Mr. Smith engaged Project ESTITCH, we began by examining transcripts of the professional development sessions and Mr. Smith's classroom implementation for moments when race and privilege were discussed. We coded how Mr. Smith handled these moments, typically either through avoidance or reinforcement of dominant narratives about race. We then triangulated these findings with how Mr. Smith talked about his own identity and student identities in the two reflective interviews we conducted with him, one during professional development and one after he implemented ESTITCH in his classroom. Based on our analysis, we developed a qualitative case study (Stake 1995) to provide an in-depth, temporal examination of the role of whiteness in one teacher's implementation of an integrated technology unit focused on NGSS disciplinary practices.

## Whiteness in Mr. Smith's classroom

The analysis is provided in a temporal sequence to highlight shifts and changes in Mr. Smith's perceptions and actions as they occurred from pre-ESTITCH to professional development to ESTITCH implementation in his classroom. We begin with his baseline behaviors wherein we see minimal engagement with technology and a rudimentary discussion of people who were enslaved that splits time evenly between the position of people who were enslaved and the position of the slave owner. From there, we explore the articulated beliefs about teaching and youth identity shared by Mr. Smith during the professional development workshop. We examine his silence and lack of engagement during specific aspects of professional development when hard topics were discussed. As we analyzed Mr. Smith's month-long instruction of the ESTITCH unit, we found that his deeper engagement with the technology and content focused on the project-based nature of the work and his students' enthusiasm. Finally, we look at his post-instruction reflections about the projects, teaching on hard topics, and working with technology.

## "Were all plantation owners bad?"

Before the professional development workshop, we observed Mr. Smith's instruction. Our baseline data collection was focused on technology integration in the elementary classroom, so we did not specify what kind of lesson we hoped to observe. On the day we observed Mr. Smith's classroom, he happened to be teaching a lesson about slavery and the Civil War. While this lesson is not connected to science, it does give us an idea of how whiteness was operating in Mr. Smith's classroom before he participated in the professional development.

At the beginning of his lesson, Mr. Smith said he felt emotionally close to the Civil War because he used to live near Gettysburg. He then went on to explain to the students, "You're going to learn about how there's more than just one reason why the civil war started, but it's hard to talk about the civil war without talking about the life of a slave in slavery. What do you think the life of a slave was like?" The first student who responded, one of the few students of color in the class, noted that the life of a slave was "cruel." This response was elaborated by white students in the class who noted that slavery was "unfair." One white student followed up by stating "they [slave owners] treated them like people with less value." Building on that comment, another white student noted, "they did not treat them like people at all. They treated them like animals or objects." Mr. Smith responded to this exchange by stating:

> A lot of, and it's hard to talk about this because a lot of slave owners treated their slaves differently. Right. But we're going to get into that. Those are some great comments. Look at some of I listed a few down, um, slaves could not travel without a written pass. They were forbidden to learn how to read and write. They could be searched at any time they could, uh, not buy or sell things without a permit. They could not own livestock. They were subject to a curfew every night. Uh, their marriage wasn't really recognized. Um, and they had to get approval from their master. Right. These aren't, these don't seem near as bad as some of the things that you said. Right. But these are all part of that dialogue.

In this conversation, between Mr. Smith and his students, we see whiteness at work. While Mr. Smith's students open the door to having a deeper conversation about slavery by presenting historical accuracies, Mr. Smith prefers the "few bad apples" approach to slave owners and minimizes the horrors of enslavement when he emphasizes that the things listed on his PowerPoint slide are "not near as bad as some of the things" the students said. In so doing, Mr. Smith reinforces white perceptions of the past, minimizing atrocities committed by white slave owners and dismissing the experiences of people of color (Chandler and Branscombe 2015). His language surrounding how slave owners treated enslaved peoples also echoes the former President Trump's comments about "fine people" in response to protests around the removal of a statue of Robert. E. Lee in Charlottesville, Virginia in 2017. At the time, President Trump noted that, in the group of neo-Nazi protesters present, "you had some very bad people in that group, but you also had people that were very fine people, on both sides." We see this language echoed in Mr. Smith's portrayal of slave owners.

Mr. Smith's next slide depicted an enslaved person whose back was deeply scarred from being beaten. As he showed his slide, he said, "I don't want to make this sad for you. I don't want to make this super sad. But sometimes slaves got whipped a lot." When he mentions not wanting to "make this sad" for his students, Mr. Smith is drawing on

white emotionality to protect himself from having to engage in hard conversations about race and privilege with his students. He moves past this slide very quickly and puts up a slide of a drawing of a slave auction. With this slide, he describes how families might not always get auctioned off together and that many families might get separated. He then noted that we do not have slavery now because we have laws to prevent it. This entire discussion of slavery lasted less than 4 minutes. Mr. Smith then delved into a discussion of the causes of the Civil War equal in length to the first portion of his lecture.

In closing this portion of the class, he summarized, "The north wanted to get rid of it, and the south wanted it. Why did they want it?… Were all plantation owners bad? No. I bet there were some amazing slave owners who were wonderful to their slaves." As described above, this language not only seeks to dismiss the historical impact of racism and white supremacy but also echoes remarks made by the former President Trump about how some neo-Nazis "were very fine people" (Trump quoted in Holan (2019) https://www.politifact.com/article/2019/apr/26/context-trumps-very-fine-people-both-sides-remarks/). At each turn, Mr. Smith seemed to justify slavery and slave owners. He also avoided opportunities to have conversations about historical realities, some of which were pointed out by his students, and ignored parallels between family separation at slave auctions and what is happening when families are detained by US Immigration at the border. Finally, Mr. Smith takes a simplistic approach in stating that slavery no longer exists simply because it is illegal. This strategy of minimizing the historical impact of racism and white supremacy that is taken up by Mr. Smith is, according to Zeus Leonardo (2002), one how white people embody whiteness. Thus, while this is only one lesson taught by Mr. Smith, it gives us a good idea of how whiteness operated in his teaching, particularly because similar remarks were repeated in his classroom the following fall when he began teaching the ESTITCH curriculum.

## "I didn't really connect with the immigration thing": navigating ESTITCH professional development

During the professional development workshop, members of the research team identified Mr. Smith as one of the teachers who was resistant to fully engaging in professional learning because of his challenges following directions. During the construction of several projects, he needed to restart his e-textiles projects because he did not follow the construction directions provided by the PD team and curricular materials (video recording, 8/8/19). While other participants took their time and made projects they would be proud to use as models in their classrooms, Mr. Smith's goal seemed to be to complete each project as quickly as possible. This often led to messy projects or projects whose circuitry was not functional (see Fig. 4). Mr. Smith's inability to create functional projects also resulted from his lack of scientific understanding of circuits. After the professional development, he reflected, "I remember, almost everyone was kind of like, you know, I don't know circuits. Because I didn't teach it my one year, I've taught fifth grade. And I'm leaving [the PD] understanding like, that's how that works. … I'm just not confident with it, though." Here, Mr. Smith articulates a lack of confidence in the circuitry content he is required to teach as part of the ESTITCH curriculum.

In addition to the science content around circuits taught during the professional development, ESTITCH uses immigration, migration, and forced relocation as themes that connect the curriculum across science, social studies, and language arts. During
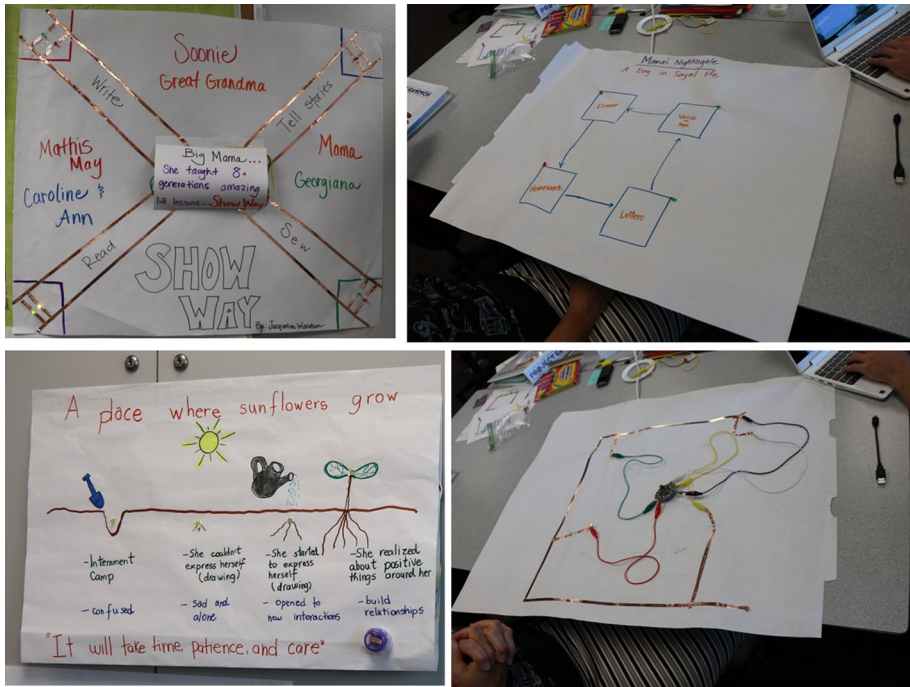
Fig. 4 Timelines (on left) created by other groups as compared to the timeline created by Mr. Anderson and his partner (right)

conversations about how to discuss immigration and forced relocation with his students, Mr. Smith was attentive but quiet. Later, when asked to share his Meaningful Moment quilt square, depicting an important moment from his own life, Mr. Smith described a mountain scene he had made to represent his children and to reflect their shared love of the outdoors. He concluded by saying, "So that's kind of my meaningful thing. I didn't really connect with the immigration thing." In this instance, Mr. Smith reflects on choosing to make a project that is connected to his immediate family rather than thinking about his family's immigration history. In minimizing the importance of immigration to his family story, Mr. Smith embodies whiteness. In choosing not to "connect with the immigration thing," Mr. Smith highlights a belief that he has always belonged in the USA. Indeed, when teaching ESTITCH to his fifth-grade class the following fall, he remarked, "If you trace my family all the way back, we were on the Mayflower. We came across the seas." Further, not "connect[ing] with the immigration thing" is another version of "I can't relate," which Picower (2009) identifies as an ideological tool of whiteness that is used to maintain white supremacy.

When interviewed by a member of the research team during professional development, Mr. Smith also struggled to answer a question about how he incorporated student backgrounds, identities, and interests into his teaching. Rather than discussing student identities, he spoke about how he pushed them to reflect on the experiences of those whose experiences they studied in their social studies curriculum. He stated:

We talk about the Holocaust, we talk about slavery… so something I've always loved to do is try to get them in those people's shoes…I really, really try to push, could you

imagine, I tried to get them in the mindset of their normal routine, and then boom, how many parents are gone?

When pressed further about engaging student identity in his teaching, Mr. Smith spoke about a differentiation program the district requires for English language learners. He delineated the steps the program set out for teaching students to read when they did not speak English fluently. In the conversation, he demonstrated no understanding of student identity beyond their categorization as first language speakers of English or English language learners. Given that during baseline data collection and ESTITCH implementation, Mr. Smith had students of color in his classroom, this is troubling. During implementation, we often saw Mr. Smith position whiteness as the absence of culture. For instance, he said, "If we didn't have immigrants…we wouldn't have culture, right?" Through statements like these and his inability to reflect on student identities, we see Mr. Smith reinforcing whiteness as the norm.

In professional development, Mr. Smith also struggled to reflect on his own identity. When asked about how his own identity influenced his teaching, he struggled with the question, saying, "I'm having a hard time putting that question together. I don't know." Mr. Smith was only aware of his own identity concerning his students, particularly around social class. He noted that his upper-middle-class upbringing was very different from that of his students who were "transient and low SES." He reflected his privilege only as opportunities that his students were missing, such as the "choice" to do well in school or to go to college. In these ways, Mr. Smith is largely unaware of his white, male identity and the privileges it affords him. This also maps to one of the ways white people embody whiteness according to Leonardo (2002). Rather than discuss race, whites name another identity construct instead, such as social class or English language learner.

## "We've gotten into a lot of different stories": implementing ESTITCH

Implementing ESTITCH in his classroom required Mr. Smith to teach about immigration, migration, and forced relocation, as well as circuitry and coding. He also worked through the timeline project, freedom quilt square, and Meaningful Moment quilt square projects with his students. When Mr. Smith implemented ESTITCH in his classroom, he still embodied whiteness when tackling hard conversations, but we observed increased confidence in his abilities to understand and troubleshoot circuitry and coding challenges his students encountered. We also observed that the use of guiding texts about immigration, migration, and forced relocation, as well as the hands-on projects, assisted Mr. Smith in teaching in more culturally relevant ways.

The first day of the ESTITCH curriculum is focused on defining the terms migration, immigration, and forced relocation. Using a PowerPoint presentation (created after the PD and without researcher input) to guide his conversation, Mr. Smith asked students to tell the class what they knew about migration. Examples included the seasonal migration of wildlife and people who went to their vacation homes in the summer. Ultimately, the class decided that migration was simple because "it's just people moving from one place to another." Mr. Smith gave an example of himself and his wife moving to a different part of the state to attend college and then returning to the town where he lives now. The class then moved to immigration, with Mr. Smith defining it as when people move from one country to another to live. He asked the class to think about where America would be without immigrants, first identifying that most everyone in the room probably had ancestors that

were immigrants and then turning his attention to food. Mr. Smith said, "Can you imagine what America would be like without immigration, without immigrants? If we didn't have immigrants, we wouldn't have any Indian food, we wouldn't have Mexican food, we wouldn't have Chinese food, we wouldn't have these wonderful things, we wouldn't have culture." In these ways, Mr. Smith reveals an underlying belief that white Americans do not have culture and that culture is comprised of food, festivals, and fun. Further, despite being given appropriate, culturally relevant examples of ways to talk about immigration, migration, and forced relocation during professional development, Mr. Smith decided to present content that was race-evasive (e.g., talking about forced relocation because of a natural disaster rather than the experiences of Indigenous peoples in the US or Japanese internment camps during WWII) and protected white emotionalities.

After defining immigration, Mr. Smith moved on to forced relocation and asked his students what they thought it meant. When a student responded, "It is when the government forces you to go somewhere else and not always for good reasons," Mr. Smith put up his definition of forced relocation, which included movement due to both human and natural causes and showed a picture of houses under water in New Orleans as a result of Hurricane Katrina. Here, he chose to emphasize the natural causes of forced relocation over human causes. Mr. Smith remained uncomfortable talking about difficult topics around historically shameful acts. He was obliged to discuss forced relocation due to human causes when a student brought up World War II as an example of forced relocation. Mr. Smith responded to the student by saying, "Let's talk about this really quickly since you bring it up." Even in how he approaches the student bringing up the Holocaust, it is clear that Mr. Smith would prefer not to talk about forced relocation as a result of human causes. He emphasized the sensitivity of the topic and referred to the Holocaust as something where "Jews were forced to live a certain way and live in certain places" rather than reference it as a genocide. Rather than allowing for a class conversation of a difficult topic, Mr. Smith transitioned the students to complete a worksheet where they were asked to define migration, immigration, and forced relocation in their own words. This is yet another example of Mr. Smith protecting his white emotionalities. His students routinely provided culturally relevant remarks and asked good questions, but Mr. Smith typically only provided a quick explanation or changed the topic.

After defining immigration, migration, and forced relocation, Mr. Smith engaged with the read-aloud book *We Came to America* by Faith Ringgold, part of the ESTITCH curriculum. It is around this book he begins to engage with the students around identifying and grappling with the various forms of human movement in American history. On each page, he asked students to engage with and identify the type of movement depicted on the page of the book:

> Mr. Smith: (Reading from *We Came to America*) "We came to America, every color, race, and religion from every country in the world. Some of us were already here before the others came and some of us were brought in chains, losing our freedom and our names." What kind is this?
> Students: Forced relocation.
> Mr. Smith: Forced relocation. (Reading from *We Came to America*) "We came to America, every color, race, and religion from every country in the world. We travel from our birthplace by boat and plane." What do you think?
> Students: Immigration.

Through the use of *We Came to America*, Mr. Smith begins to engage his students in more culturally relevant teaching around immigration, migration, and forced relocation. For

several days, Mr. Smith introduced circuits to his class and moved students into the first large project—the Timeline Project. On the day he first taught circuits, he noted, "I'm kind of nervous just because social studies is a lot easier to talk about for sure. Then, circuits, which I don't understand super well" (Video Recording, 10/03/19). Initially, Mr. Smith relied heavily on members of the research team who observed his classroom to answer questions about the science content of ESTITCH. However, as students began to work on designing and constructing their timeline projects, Mr. Smith became more comfortable debugging projects with his students. While his answers weren't always technically correct, he encouraged students to systematically look for problems and test potential solutions. During this project, groups of students read a picture book focused on immigration, migration, and forced relocation and then made a programmable paper circuit where LEDs lit up in a sequence that captured the timeline of events in their story of human movement (see Project & Curriculum Overview above for more details about the timeline project and programmable paper circuits). As students engaged in designing and constructing their computational circuits, Mr. Smith listened carefully to each group's ideas and encouraged the personalization of the projects. For instance, he helped one group whose timeline project was around *We Came to America* by Faith Ringgold troubleshoot their timeline and made some suggestions about how they could program their circuit to best reflect the ideas from the book:

> Mr. Smith: The ground ones [connections] are really loosey-goosey. So with the LED lights is the longer side positive or negative? Do you remember?
> Student: The longer side is positive.
> Mr. Smith: So this is the longer side, isn't it? And you have it connected to the negative. So these should be switched.
> Student: Oh, that was my fault.
> Mr. Smith: No, it's just something we're looking at. It just takes a little playing.

After helping the group to fix their circuitry, Mr. Smith emphasized group ownership over the project:

> This is one hundred percent your project. This is you guys owning it. You just doing it. I like what you're doing [on your timeline], but it's almost like, it'd be cool to freeze [the LEDs] … So, they all light up, and then they go to America. It'd be cool if they all turn off at the same time and then started again. Does that make sense?

Here, Mr. Smith is making suggestions for how students might connect their timeline design, which has lights at the outside corners of the page representing people from other countries, and one light at the center representing the USA, to the circuitry and coding of their project. In his engagement with students, Mr. Smith focused on how the technology could help them tell the story of the people who had moved. In this way, the integration of science, social studies, and language arts facilitated opportunities for Mr. Smith to engage in culturally relevant teaching.

Using science and technology as tools for telling stories continued throughout ESTITCH implementation in Mr. Smith's classroom and was especially evident in the final project, where students are asked to make a light-up quilt square that represented a meaningful moment in their life. Mr. Smith introduced the project by saying:

> Okay, so we've kind of gotten into a lot of different stories since that first, since we started this from the beginning, listen and read and talked about a lot of different stories. The timelines are made by certain stories, you just hit a book flood with a

bunch of different stories. … So my challenge to you is before we start this tomor-row… I want you to think about it. Maybe talk to a parent, sibling, grandparent, and talk about something that is an artifact to you or your family. …So that when we start tomorrow…You kind of have an idea and you start doing something that means something to you. Now this project that we're doing is a little bit harder, but it's the same thing as the last one we did. You're gonna thread [snaps] on, you're gonna have a power source. You're gonna have LED lights, but it's going to be your idea. It's going to be your schematic. The way that you wire it is your idea, the way that you do the art is your idea. It should be meaningful to you.

In Mr. Smith's introduction to the Meaningful Moment quilt square project, we see how he leverages both the theme of stories from ESTITCH and the use of science and technology as tools for telling stories. This is evident when he describes how the circuit schematic, conductive sewing ("the way you wire"), and the coding of LED lights to blink will be unique to each project. In these ways, the texts about immigration, migration, and forced relocation, combined with e-textiles projects, which integrate science and social studies, provided opportunities for Mr. Smith to develop as a culturally responsive teacher, even if he chose not to fully engage with the material and at times, such as when defining forced relocation, blatantly went against what was taught in professional development, choosing examples that ignored historical realities and minimizing the experiences of people of color.

## "This content is specifically meant for accepting people like her": Mr. Smith reflects on teaching ESTITCH

Throughout ESTITCH professional development and implementation, Mr. Smith was uncomfortable with the ESTITCH content around immigration, migration, and forced relocation because it went against white common sense (Leonardo 2009). However, engagement with the culturally relevant texts that are a part of the ESTITCH curriculum provided a space where Mr. Smith could practice culturally relevant teaching. He was also successful in supporting his students in project-based learning, especially the troubleshooting and debugging aspects of working with coding and e-textiles materials. When a member of the research team interviewed Mr. Smith after he implemented ESTITCH in his classroom the focus was, perhaps unsurprisingly on student experiences of ESTITCH. Mr. Smith remained uncomfortable reflecting on his own whiteness and the classroom culture he established.

Mr. Smith was especially enthusiastic about how the personally relevant aspects of the project, especially the final Meaningful Moments quilt square, engaged students more powerfully than any other aspect of his curriculum. He spoke at length about how the curriculum and projects allowed his students to feel represented in the curriculum and their classroom for the first time. He reflected:

I have a child in my class who's from Somalia and it was like this content is specifically meant for accepting people like her. We're talking about how everyone came from all these different places and how we have different traditions and different ways of dressing and different things that we eat. I thought that was really power-ful for her. I wish she would have been a little bit more outspoken about it. Because she would talk to me away from the class and say this is the exact same thing that

I'm feeling. But she would never share it in front of the class. And I was hoping she would (Interview, 11/12/19).

Here, we see how Mr. Smith begins to recognize the importance of creating spaces for all of his students rather than just the white, middle-class ones to see themselves in the curriculum. However, he still emphasizes the easily accepted aspects of cultural difference, such as traditions, clothing, and food while focusing on an individual student rather than on how the educational system is set up to make people like this student feel excluded. Further, it is important to note that while the student felt comfortable sharing with Mr. Smith, the classroom culture wasn't constructed in such a way that she felt comfortable sharing with the whole class. We further wonder what motivated Mr. Smith to note that he wished this student would share her experiences with the whole class. Likely, such a move would have further spotlighted her difference as one of a very small number of students of color in Mr. Smith's class.

Mr. Smith also saw a trend across his class where the final project encouraged students to share more about themselves and their families in the classroom context while also supporting a better understanding of historical events through the emotional connection that was fostered. In describing what students chose to represent on their final, personal story quilt squares, he reflected:

> A lot of them had situations where it was like, 'Oh I went through this, my dad lost his job, we got placed or we had to move, we had to meet new friends, we had to live in a new place.' But getting those kids talking about those things? I loved that! I don't want to say the deepness of it, but the rawness of it. Because usually when we teach we're like 'this was World War II and it started on this day and that happened because of this and these are the major battle[s].' This one [the ESTITCH curriculum] was so real, kids started identifying where they're at in their life and who do they know that came from other places and were they being supportive of them. They make them feel welcome and it kind of brought a more of an empathy side for the lesson. Which was really neat. I really liked that. (Interview, 11/12/19)

In this reflection, we see Mr. Smith starting to see the value of one of the basic tenets of culturally responsive pedagogy—students must be supported in maintaining cultural and linguistic practices from home. However, in emphasizing his students' experiences, the absence of reflection on his experiences and how they differ from those of his students is also clear.

Mr. Smith also observed that the technology aspect of the project was important. While he struggled with the integration of coding during the PD, he saw his students actively engaged. He commented, "I've never seen more excitement out of kids. So the coding and creating thing with projects, they loved it. And having their ideas, on that final project where there was their square and they designed it how they wanted to do it and it meant something to them" (Interview, 11/12/19). In this way, the technology became an important part of how students were able to express themselves. Yet, if we remember from the professional development, Mr. Smith chose to create a Meaningful Moment square in a way that actively resisted thinking about immigration, migration, and forced relocation, choosing to focus on a trip taken annually by his immediate family.

In his post-instruction, interview, Mr. Smith also noted that engaging students through technology-based learning afforded students from various backgrounds and abilities an opportunity to shine. He shared the story of a girl, Amina, in his class who struggled tremendously during his typical instruction. He noted she spent the majority of her day

working with a special education specialist to help her learn basic reading skills. However, her experience during ESTITCH was dramatically different:

> She's probably the lowest in this grade. And, and I don't know the whole story, but she might've been a refugee. I don't know where she came from, but she ended up in Thailand for a little bit and then came here and she's a very low reader and she processes things a little bit slower. And so in class sometimes she gets something but it takes forever to process. Most of the day she's in resource classes. She nailed this project and it was so cool to see because she was a highlight. Her and three or four other kids were the fastest and she was able to follow the directions. She did the stitching perfectly. She got her light to work almost instantly. And it was one of those things where I thought this is so good for her cause she's, she's never on top or the highlight of math or reading or when they go to the gym and then all of a sudden here she is sitting in her group and the kids that are usually in those top positions are looking at her like, 'how are you already to that point I can't even get?'

Here, we see another tenet of culturally responsive pedagogy play out—the opportunity for all students to experience academic success. Yet, Mr. Smith's narrative of Amina's success is filtered through his White gaze and laden with deficit language that fails to recognize the role linguistic and cultural socialization may play in Amina's behavior in the classroom and his perceptions of those behaviors. He seems to know very little about Amina's experiences and doesn't seem to have taken the time to have asked. Further, while he recognizes that Amina struggles during his regular instruction, he fails to question why this might be so or to articulate how he might shift curriculum, pedagogy, and classroom culture in ways that would better support students like Amina and Sabrina in his classroom. While students in Mr. Smith's class repeatedly demonstrated a willingness to engage in difficult conversations, Mr. Smith's whiteness and his investment in protecting whiteness obscured his ability to engage in the necessary work of ESTITCH and culturally relevant teaching more broadly.

## Reflecting on the role of whiteness

In this study, our goal was to examine the role of whiteness in one teacher's implementation of an integrated technology unit focused on NGSS disciplinary practices. We found that despite being provided with specific training around culturally relevant teaching and being asked to reflect on his own racial identity during professional development, Mr. Smith remained committed to whiteness and white supremacy. During ESTITCH implementation, the culturally relevant texts provided as part of the curriculum (e.g., *We Came to America* by Faith Ringgold, *Show Way* by Jacqueline Woodson) and the e-textiles projects provided a space where Mr. Smith was able to engage with his students and reflect on how the projects connected to student identities. We found that as Mr. Smith moved through the professional development, enacted the curriculum in his classroom, and reflected on those experiences, he became increasingly articulate about how important it was to recognize the cultural and linguistic resources his students brought to the classroom. Mr. Smith also recognized how important it was for all his students to experience academic success in the classroom. However, he was unwilling to interrogate why his classroom culture, curriculum, pedagogy, and the educational system as a whole did not support learners of color within his classroom. We saw no change in Mr. Smith's abilities to reflect on his

identity and privilege. When he discussed what he learned from participating in ESTITCH, it was always about his students. He continued to frame many of their experiences (e.g., refugee resettlement) as something he could not relate to, an ideological tool of whiteness. As Picower (2009) explains, "Tools allow a job to be done more effectively or efficiently; tools of whiteness facilitate the job of maintaining and supporting hegemonic stories and dominant ideologies of race, which in turn uphold structures of White Supremacy" (pp. 204–205).

## Implications for teacher professional development

Cases like Mr. Smith are common within teacher professional development and practice. White teachers in rural places frequently take only one multicultural education course during their teacher preparation and frequently teach in places where the majority of their students and their students' parents share their same racial ideologies, but this is changing as rural America becomes more diverse. In the remainder of the discussion, we ponder how we as researchers and professional development leaders might better support other teachers like Mr. Smith in thinking critically about how whiteness and privilege operate in their lives, their students' lives, and in the educational system.

We noted that the professional development was primarily focused on developing teachers' science content knowledge and having them make the electronic textiles projects. While we talked with teachers about how to have difficult conversations with their students, we spent relatively less time having teachers reflect on their privilege and experiences. Within the professional development, science and social studies were presented as discrete topics that overlapped through the e-textiles projects. As a result, it is hardly surprising that Mr. Smith remained comfortably situated in James Banks (2013) first two levels of multicultural curriculum reform. In Banks' typology, there are four levels: (1) contributions, (2) additive, (3) transformative, and (4) social action. Mr. Smith recognized the contributions of racial and ethnic groups (e.g., food) (Level 1) and added the ESTITCH unit (Level 2) to his existing curriculum without transforming how events (e.g., slavery and immigration) were viewed (Level 3) or taking social action (Level 4), such as having students write letters to the Congressman about immigration issues.

Given that science education was one of the last content areas to embrace multicultural education (Atwater 2012), future iterations of the ESTITCH professional development could focus more explicitly on multicultural education in the context of science. In addition, Felicia Moore Mensah (2021) emphasizes that teachers need exposure, experiences, change, time, and resources to become multicultural educators. Having Mr. Smith repeat the ESTITCH professional development and implement it a second time in his classroom would be one approach to providing additional exposure, experiences, and time. Another possible approach to providing exposure and resources would be to engage all ESTITCH teachers in a book club during the year. The book club model has shown some success in pre-service science teacher education (Mensah 2009), although Yoon (2012) found that conversations about race among a white teacher study group were deracialized and created a space to affirm what teachers were already doing rather than challenging their beliefs. Perhaps carefully selecting the book and having a book club led by a member of the research team would provide spaces for reflection and critique.

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