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**CULTURALLY RESPONSIVE TEACHING THAT BRIDGES
INDOOR AND OUTDOOR SETTINGS**

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ABSTRACT

Culturally responsive teaching is a pedagogy that embraces full equitable access to education for students from all cultures. These strategies include learning within the context of culture and implementing student-centered teaching while communicating high expectations. The primary purpose of our two summer projects was to reshape our approach to curriculum design and development by incorporating culturally responsive teaching strategies. Two case studies, a marine ecology program and an alternative route teacher education program, provide evidence that culturally responsive teaching translates well between indoor and outdoor settings. In the first study, we initiated discussions with Suquamish and Port Gamble S'Klallam tribal representatives and determined that a focus on understanding and maintaining a healthy Liberty Bay aligned best with the cultural context of the local tribes. With tribal representatives, we established three related themes: restoration, estuary function and ocean currents, that would define our inquiry-based experiences infused with culturally responsive teaching. Then, in the second study, using a mixed methodology, we followed the preparation of fifteen teacher candidates through a summer content immersion and schoolyard ecology field experience as part of their alternative route to teacher certification program. We purposely designed the summer study to support and learn from the funds of knowledge of the teacher candidates and migrant youth. Next, we sought to determine if a culturally responsive pedagogy, modeled in a cell biology course could be applied to plan and teach schoolyard ecology during a migrant youth academy. Our findings suggest that culturally responsive teaching can positively support the cultural and community wealth of teachers and students while affirming and deepening our appreciation of the natural world.

KEYWORDS

Culturally, Responsive, Student-centered, Environmental, Science, Education, Teaching

INTRODUCTION

As children spend more time in urban settings, they are making fewer connections with the natural world (Louv, 2005; Pyle, 2002). Accompanying this trend is an increase in on-line access encouraging more social media use by youth. In addition, a growing number of schools in the United States are adopting one computer or tablet per student or what is called 1:1 technology (Herold, 2016). As teachers develop their sophistication with on-line educational tools, they increasingly remain within their classrooms with fewer field trips outside. Clearly, for children to form more intimate relationships with the natural world, they need teachers and adults who will help them explore their own schoolyards and nearby natural environments (Louv, 2006). While students in migrant families often have parents that work intimately with the agricultural land, the students themselves may not have access to the resources

or opportunities to deepen their knowledge and appreciation of their schoolyard or surrounding fields. Similarly, students in Native communities may have family members who live and work by the sea but may not extend opportunities for children to build relationships to the sea. By supporting teachers' understanding of ecological principles linked to culturally responsive teaching, we can reach more children with the message of how to better sustain a habitable planet (Orr, 2004). This paper describes two summer teacher education programs facilitated by a professor and graduate students that bridge indoor and outdoor settings in support of culturally responsive teaching.

METHODS

When designing the summer programs, we purposely integrated culturally responsive teaching (CRT) strategies for the summer learning experiences. Early in the development of CRT, Ladson-Billings (1994) suggested that teachers must acknowledge the importance of including students' cultural references in all aspects of learning. In the interim, CRT ("Culturally Responsive Teaching," 2017) has evolved to include these overlapping strategies:

- implementing student-centered practices while communicating high expectations
- learning within the context of culture
- modeling teacher as facilitator
- reshaping the curriculum to include culturally mediated instruction
- positive perspectives on parents

By attending to these strategies, we hoped to better support the development of two unique summer science learning programs that aligned with culturally responsive practices. What follows is a description and analysis of two case studies, a marine ecology youth program and an alternative route summer program. These programs illustrate the use of CRT in the design and implementation of novel science curriculum that bridges indoor to outdoor settings. Our data sources for the first case study included content assessments, surveys, interviews and facilitator/candidate reflections and are explained at greater length in a previously published paper (Burgess, Dowdy, & Feiro, 2018). The data for the second case study included more culturally responsive research conceptions such as self-interrogation found in instructor notes and collaborative planning expressed in instructor and teacher candidates' reflections (Berryman, SooHoo, Orange, & Nevin, 2013).

RESULTS

Case Study 1: Marine Summer Program

During the summer of 2017, a planning team from Western Washington University (WWU) and Science Education Aquarium (SEA) Discovery Center on Liberty Bay in Washington embarked on an

ambitious project to reshape the marine center’s science curriculum for grades 6-8 to include culturally mediated instruction. We hoped to build a curriculum that integrates diverse ways of knowing and representing information. This new middle school programming would serve local schools, as well as participants in various youth programs, including for the Suquamish Tribe and Port Gamble S’Klallam Tribe. Based on early discussions with tribal representatives and the director of SEA Discovery, it was decided that a focus on understanding and maintaining a healthy Liberty Bay aligned best with the *cultural context* of the local tribes. Three related themes (restoration, estuary function and ocean currents) coalesced around inquiry-based experiences infused with CRT.

For example, the Grade 6 curriculum focused on restoration tied to a guiding question, “How can we use our knowledge of the life cycle of the Olympia Oyster to help restore its population here in Liberty Bay?” With their *teachers working as facilitators*, students in the summer pilot are challenged to develop a model for how fixed or sessile organisms such as shellfish can thrive in marine environments. Consequently, as students explored the lifecycle of the Olympia Oyster, they decided to track the growth and development of their young oysters purchased as “spat on shell” from the Puget Sound Restoration Fund. Ultimately, students developed a durable protocol that all visiting school groups can use to monitor the growth of Olympia Oysters. The shared data set becomes a community resource to better understand the health of Liberty Bay. Because culturally mediated instruction incorporates diverse ways of knowing and representing information, students are encouraged to build data tables and graphs along with creating culturally relevant stories, poems, songs and art to represent and communicate their new understandings.

Case Study 2: Alternative Route Summer Program

Alternative Route teacher education programs enable teacher candidates to learn to teach while teaching. The Western Washington University (WWU) year-long teacher preparation program, supports working teacher assistants or paraeducators to become certified K-8 teachers with an English Language Learner (ELL) endorsement. One component of the program is a 5-week summer science education program that supports 15 teacher candidates; the majority were ELL, Latinx, first generation college students. The summer program was intentionally built with an initial content course in biology focused on *student-centered* inquiry. Based on Gay’s (2000) research, that suggests curriculum that utilizes cooperative learning groups and peer collaboration is best matched the cultural systems of Latinx groups, we selected Life Science and Everyday Thinking (LSET). Modeled after the effective Physics and Everyday Thinking (PET) curriculum, Donovan et al. (2013) had designed and piloted this innovative 10-15-week life sciences curriculum for elementary education majors at WWU.

As content instructors, we consulted with the authors of the curriculum and carefully selected an intensive 5-day section of the LSET curriculum that focused on the cellular basis of life. As facilitators,

we openly applied CRT strategies during the cell biology unit by modeling *student-centered practices* while supporting the community norm of high expectations. Our candid modeling of metacognition and self-reflection engaged our students in what Weimer (2002, p. 15) calls the “hard, messy work of learning.” Soon, our ELL candidates were embodying student-centered learning strategies as they worked to agree on a set of evidence-based biological ideas that explained the existence of living cells. Latinx teacher candidates thrived in this collaborative space that mimicked aspects of their ELL training. As candidates demonstrated finesse with evidence-based reasoning strategies, they had *high expectations* for table work and whole class discussions. The *student-centered practices* and *high expectations* resulted in a strong learning community and uniform gains in content knowledge (an average of 32.3 percentage points improvement).

After concluding the weeklong content course, we transitioned to a rural K-8 school where Alternative Route teacher candidates prepared, taught and assessed a one-week field program centered on schoolyard ecology for the elementary students enrolled in the Migrant Youth Academy (MYA). From the outset, the collaborative facilitation team was determined to shape the curriculum to be *interdisciplinary, meaningful* and *student-centered* tied directly to the student’s background and culture (“Culturally Responsive Teaching,” 2017). Working in groups of three, teacher educators collaborated with their cooperating teachers, several faculty and two graduate students to prepare a week-long series of schoolyard ecology lessons. The plan was for each learning group of 10-15 students to spend the morning focused on indoor literacy activities followed by outdoor schoolyard ecology each afternoon.

Teacher candidates were also able to transfer the student-centered practices from classroom to field. For example, during a field trip to local estuary, candidates created student-oriented learning activities that included using student’s prior knowledge (obtained from the schoolyard investigations and recorded on student science journals) to develop hypotheses about the new habitats. They scripted questions that encouraged students to test their initial ideas by making new observations. They planned student discussions using mini-white boards that provided evidence and visual thinking to support students’ new collaboratively derived ideas.

DISCUSSION

This section addresses the CRT strategies as they were employed to design and implement inquiry-based science curriculum.

Implementing student-centered practices and communicating high expectations

In both case studies, inquiry-based activities allowed students themselves to build specific scientific concepts using their own experimental observations. Small collaborative learning groups are the norm during evidence gathering activities and experiments. Over time, students learned to trust their own

observations and investigations, leading to an increased willingness to critique and challenge their own and each other's provisional thinking.

Learning within the context of culture

By focusing collaboratively on the natural communities of the schoolyard and marine center, we hoped to extend, support and learn from the cultural community wealth of the candidates and their students. For example, during the alternative route program, most of the teacher candidates were raised in the same communities and schools they now serve. Because of this long-standing connection to the land, the culturally derived knowledge and skills, termed "funds of knowledge" by Moll et al. (1992, p. 133), created a deeply woven and rich agricultural community. The proximity of the open schoolyard to active vegetable, berry and bulb fields reminded us that many of the migrant student's families work these crops.

By weaving the student's experiences, skills and knowledge within the curriculum, we sought to make meaningful connections between student's school and home life (Padron, 2002). Thus, the culturally derived knowledge and skills that the students and candidates possessed supported a healthy and high functioning summer school community. Since the schoolyard is adjacent to active agricultural fields, we encouraged the teacher candidates to purposely prepare their schoolyard lessons to recognize the interwoven communities of land and culture.

Modeling teacher as facilitator

The communal nature of inquiry-based learning provided many opportunities for teachers to facilitate peer-to-peer learning. For example, during the alternative route program teachers encouraged collaborative work on the creation of schoolyard field guides. We found that students could playfully develop their bilingual assets while practicing important life skill of collaboration. Students and teacher candidates often used a combination of English and Spanish to ensure new concepts and academic language were communicated clearly. Students also referred to technical field guides on plants and animals that allowed them to practice reading dense technical material in an environment that welcomed questions and discussion with their peers and teachers. "Turn and talks" and small group discussions were particularly useful for the development of oral communication skills and academic language development. Strategically, teachers helped facilitate the Schoolyard Ecology unit to allow the youth, most of whom were bilingual, the opportunity to develop their strong communication skills.

Reshaping the curriculum

In both case studies, we found that when we listened carefully to teacher candidates and situated the academic learning within their lived experiences and frames of reference, they found the learning

meaningful and learned easily. Also, the selection of the place-based curriculum, and learning activities were purposely aligned to acknowledge and support the cultural and community wealth of the candidates and their students. For example, the inquiry-based marine science lessons reflected the lived experiences and frames of reference that were meaningful to tribal educators and would be incorporated into the statewide “Since Time Immemorial” curriculum.

Similarly, during the alternative route program, students were encouraged to make field notes using Spanish and English descriptions. This asset-based approach to communication was encouraging to elementary students who easily made connections between their own community rendered field guides and the primary sources used to identify, describe, and illustrate plants found in the schoolyard. The resulting bilingual guides were readily accessible to family members.

Positive perspectives on parents

Drawing from their rich home and community experiences, the alternative route teacher candidates brought unique knowledge, experiences and cultural awareness to their teaching. By emphasizing assets over deficits, Yosso (2005) challenges us to abandon a deficit view of Communities of Color. Yosso names these assets as aspirational, navigational, social, linguistic, familial and resistance capital. Together, these assets comprise a community cultural wealth that challenges traditional views of the more simplistic cultural capital.

An illustration of community cultural wealth that involved a *positive perspective on parents* occurred as we prepared to teach the Schoolyard Ecology. When teacher candidates learned that not enough students had signed up for the program, they responded to the enrolment crises by accessing their deep community ties, historical context, and cultural intuition (Familial capital) to call local Latinx parents and recruit individual children into the program. Next, they exercised their Social capital to work across family networks and community resources to arrange bus transportation for the children. Also, by utilizing their Linguistic capital, they were able to use multiple communication strategies and languages to describe the rich educational program to parents and community members. The phone calls with parents also created natural pathways to access the “funds of knowledge” of families as they described their child’s background, interests and abilities (L. Moll, Amanti, Neff, & Gonzalez, 2005; L. C. Moll et al., 1992). By utilizing their deep family and community connections, the teacher candidates catalyzed a surge in participation by local families in the summer program. We found that an assets approach is integral to creating successful communities.

CONCLUSION

By opening our classroom to the outdoors, we observed that instructors, teacher candidates and students build dynamic interconnected communities of learners. As teacher candidates navigated small group investigations, we came to realize that learning in natural settings is a compelling and effective way to bridge diverse human communities while initiating new teachers to science instruction that is culturally responsive. Thus, by respecting our student's cultural integrity, we were able to engage our learners in a pedagogy that effectively crossed disciplines and cultures as well as indoor and outdoor settings. Finally, by utilizing student-centered teaching to link a content in biology with a schoolyard and marine ecology units we effectively worked at the intersection of science and culture in service of a more just and equitable world.

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