At the Intersection of Teaching and Cultural Diversity:
Modeling a Culturally Responsive Mathematics Pedagogy for the U.S. Virgin Islands

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Abstract

Faculty at the University of the Virgin Islands are developing a new STEM teacher preparation program by adapting an existing, nationally recognized model. In developing this adaptation for the preparation of mathematics teachers, we found it prudent to consider the social and cultural context in which our future teachers will teach. We enacted a four-phase methodology to first develop a model of culturally responsive pedagogy and then to use that model to inform a teacher preparation program for secondary mathematics teachers. We interviewed high school mathematics teachers and other stakeholders and then conducted classroom observations. These interviews and observations yielded eight features of a culturally responsive mathematics pedagogy for the U.S. Virgin Islands. We then used these “Principles of Culturally Responsive Practice” to construct a model of culturally responsive pedagogy that continues to inform the design of pre-service mathematics teacher preparation and in-service professional development. We suggest that this four-phase approach can serve as a model for developing a community-based culturally responsive pedagogy.

Introduction

In “Empowering Education” (1992), Ira Shor lays out the consequences for students in traditional, teacher-centered classrooms when instruction fails to make personally meaningful cultural connections. He writes, “People begin life as motivated learners, not as passive beings.
They learn by interacting, by experimenting, and by using play to internalize the meaning of words and experience. But year by year their dynamic learning erodes in passive classrooms not organized around their cultural backgrounds, conditions, or interests” (p. 17). “[They] learn to be passive or cynical in classes that transfer facts, skills, or values without meaningful connection to their needs, interests, or community cultures (p. 18).” Negative emotions [such as] self-doubt, hostility, resentment, boredom, indignation, cynicism, disrespect, frustration, the desire to escape… are commonly generated when an official culture and language are imposed from the top down, ignoring the students’ themes, languages, conditions, and diverse cultures” (p. 23).

The interaction between culture and learning is a critical and complex process. Learning occurs in social and cultural settings and so it depends in part on the resonance between the learner’s cultural environment and the environment in which teaching takes place (Vygotsky, 1978). “Culture influences the experiences people bring to the classroom, how they communicate, how they expect to learn, and what they think is worth learning” (Darling-Hammond, Rosso, Austin, Orcutt, & Martin, n.d., p. 7). Therefore, given the significant interaction between culture and learning, teacher preparation programs cannot afford to take culturally generic approaches to teacher preparation. Often, however, in programs for which there is some consideration of culturally relevant pedagogy (e.g., Gay, 2010; Ladson-Billings, 1995), culture is taken rather globally, with consequent assumptions of general approaches to teaching for diversity that may not allow or provide avenues for students’ culturally relevant contributions. In light of the research that underscores the importance of connections between home and school cultures, we propose that a teacher preparation program should be considerate of the broader social and cultural context in which its future teachers will teach. This consideration not only demonstrates an ethic of respect for students’ context, it also yields the sort of contextual understanding that
will support more effective teaching. Consequently, while there is indeed a rich body of literature on culturally responsive pedagogy (CRP) that can and continues to serve as a guide for developing pedagogical models of multicultural education, we found it more prudent to take a community-based approach, which grounds the CRP development in the unique context of the U.S. Virgin Islands (VI).

At the 2010 census, the population of the VI was primarily Black or African American (76.0%) and White (16.6%). Additionally, 17.4% of the population identified as Hispanic or Latino. 46.7% of the population was born in the U.S. Virgin Islands, 34.7% in Latin America and the Caribbean, and 15.8% in the United States (United States Census Bureau). Consistently, more than three-fourths of the students who attend the University of the Virgin Islands (UVI) enter unprepared for college-level mathematics work. This trend suggests that there are systemic issues fundamental to this pattern of outcomes, rather than issues that wholly reside within each student. Since UVI is the only institution in the region that prepares teachers, it is in a unique position to enact systemic reform. With this in mind, faculty in the School of Education and in the College of Science and Mathematics at UVI are developing a secondary STEM teacher preparation program called UVITeach by adapting the UTeach model (https://uteach.utexas.edu). UTeach is a nationally recognized model of teacher preparation is currently being implemented at 44 universities in 21 states and the District of Columbia (The University of Texas at Austin: College of Natural Sciences, n.d.). Consistent with our proposition that teacher preparation should be considerate of the broader social and cultural context, this adaptation required that we model a contextually situated, culturally responsive pedagogy in order to help us align it with local contextual and cultural needs and interests. Thus, this study aims to foster systemic reform relative to teacher education by taking a community-based approach to teacher preparation in
terms of its consideration of currently unrealized cultural knowledge and contextual factors that are likely to inform teaching and learning. “Prospective teachers do not easily relinquish beliefs and attitudes about themselves or others,” writes Gloria Ladson-Billings in *The Dreamkeepers* (1994), “Thus a serious effort toward preparing teachers to teach in a culturally relevant manner requires a rethinking of the teacher preparation process” (p. 143).

**Theoretical Perspectives**

To frame this investigation which takes place at the intersection of teaching, culture, and context, we use Gay’s (2010) conception of culturally responsive teaching, which she defines as a pedagogy that leverages “the cultural knowledge, prior experiences, frames of reference, and performance styles of ethnically diverse students to make learning encounters more relevant to and effective for them” (p. 29). Although a variety of terms have been used throughout the literature to name the kind of pedagogy we aim to theorize (e.g., culturally relevant pedagogy, culturally responsive teaching, culturally congruent teaching, etc.), Gay’s notion of “responsive” fits best, because it recognizes the “interactions among ethnic identity, cultural background, and student achievement (i.e., between culture and cognition)” and what she sees as the “transformative potential of teaching grounded in multicultural contributions, experiences, and orientations” (p. 27). For instance, teaching can be transformative when it accounts for alienating experiences that discourage students from deeper mathematical engagement and the pursuit of careers in the mathematical sciences. Gay’s notion has also been used elsewhere in the literature in a study by Averill et al. (2009) that set out to determine whether mathematics teaching could leverage cultural aspects to develop mathematical thinking. Mindful of the fact that although frameworks for culturally responsive teaching abound, too few examples are evident in mathematics classrooms, these researchers examined models of mathematics education...
consistent with Gay (2000) and Ladson-Billings’ (1990) frameworks in order to answer this question. In short, they found that teacher educators could support the development of preservice teachers’ models of a culturally responsive pedagogy for mathematics by incorporating contexts and pedagogies throughout teacher preparation coursework that are drawn from the communities in which their students will teach. Moreover, by developing their own “personal cultural knowledge and skills [and also] critically reflect[ing] on their own culturally responsive practices” (p. 181), preservice teachers could adopt this practice for themselves. Similarly, Ukpokodu (2011) drew on Gay’s work to analyze data in an investigation that aimed to answer the question, “What are culturally responsive mathematics teaching practices?” In addition to the resonance that Gay’s conception has with our own, these applications of her framework within the mathematics education research literature lend further support to our decision to frame our own investigation using Gay’s work.

Next, three interrelated perspectives are used to identify sources of evidence in relation to Gay’s conception: sociocultural context, community cultural wealth, and funds of knowledge. Wong, Taha and Veloo’s (2001) conception of sociocultural context as encompassing historical, political, ethnic, linguistic, and cultural factors (p. 113) is used to frame and subsequently understand the particular context in which teaching takes place. Then, to better understand the knowledge that learners bring to teaching situations, we draw on Yosso’s (2005) conception of cultural wealth as “an array of knowledge, skills, abilities and contacts possessed and utilized by Communities of Color” (p. 77), and Moll et al.’s (1992) notion of funds of knowledge as the “historically accumulated and culturally developed bodies of knowledge and skills essential for household or individual functioning and well-being” (p. 133). We believe that an understanding of cultural wealth and funds of knowledge can help us identify cultural and contextual resources
specific to the U.S. Virgin Islands that have potential utility for understanding the interaction between teaching and learning, and thus for informing teachers’ pedagogy.

**Research Question**

*How can we develop a model of culturally responsive mathematics pedagogy for the U.S. Virgin Islands and use it to inform the design of a secondary mathematics teacher preparation program?*

**Methods**

Prior to completing graduate school and taking a position at UVI as a mathematics educator, the first author had taught high school in the United States for several years. At the outset of this study, he was the coordinator of the Foundation Mathematics program at UVI. This program—formerly referred to as the developmental or remedial program—prepares incoming students for college-level mathematics work. He was also a teacher in the program. In this capacity, he sensed a shift in his pedagogy as he encountered experiences that suggested to him that teaching in the VI was not congruent to teaching on the mainland. When the second author came to UVI he joined the faculty as a mathematics educator and the Foundation Mathematics program as a second coordinator. Not long after arriving at UVI, he became interested in building communities of mathematics teachers across the territory who would develop and share exemplary teaching practices that would promote the engagement and retention of students who too often lacked equitable access to high quality teaching. As Bernstein (1990) argued, the “hidden pedagogies” of VI teachers could be unpacked and critically examined within a socio-cultural context in order to develop culturally responsive practices that may make teaching more
effective for students. Also, following the work of Powell (2004), which provided evidence that as the agency of sixth grade students of color increased, so did their mathematical achievement, the second author sought to understand the conditions for cultivating students’ agency and their identities as mathematics learners through the practices of experienced mathematics teachers and their relationship to a culturally responsive practice.

Taken together, these authors’ experiences planted the seeds for this investigation. Consequently, because the investigation grew out of these experiences in naturalistic settings where each of us had observed and participated in activities with the people we would be investigating, we designated our roles in the study as participant observers (Spradley, 1980).

Participants

Local high school mathematics teachers serve at UVI as adjunct mathematics instructors and are hired based on their qualifications and continued performance. We selected seven teachers and one district-level administrator from among these adjunct instructors based on these existing relationships. Two professors within the College of Humanities and Social Sciences at UVI also participated. Both professors had lived in the Virgin Islands for over twenty years. We were convinced that their knowledge of the context and the nature of their research in the social sciences could be brought to bear in helping us better identify and understand local contextual and cultural factors. Through a process of community nomination (Foster, 1991), these nine participants were then asked to use their own criteria to identify other mathematics teachers they regarded as effective. Another six teachers were nominated and consented to participate in the study. This recruitment process yielded fifteen participants, each of whom we believed could help us undertake and achieve a community-based approach to the development of a culturally responsive pedagogy.
Our approach to developing a model of culturally responsive mathematics pedagogy for the U.S. Virgin Islands that would inform the adaption of a secondary mathematics teacher preparation program proceeded in four phases. In the first phase, we interviewed mathematics teachers and conducted observations in their classrooms. In phase 2, we analyzed that data to determine essential features of this model of pedagogy. In phase 3, we connected those findings to teachers and teaching by using them to design and implement professional development workshops with teachers who would become mentors in the program. Lastly, in phase 4, we used our research findings and the outcomes of those workshops to adapt the UTeach model through adaptations of its core courses. We now move on to describe each of these four phases.

**Phase 1: Collecting and Analyzing Interview and Observation Data**

Since sociocultural factors underlie the diversity of forms and features of classroom interactions (e.g., communication patterns, cultural mores), we began by identifying and characterizing sociocultural factors that impact the nature and practice of mathematics education (Wong et al., 2001). Because teachers’ beliefs guide their classroom practice (Jones & Carter, 2006; Kagan, 1992), we conducted semi-structured interviews with all fifteen participants to infer these “educational beliefs about” (Pajares, 1992) effective teaching. One semi-structured interview was conducted with each participant for a total of fifteen interviews ranging in duration from 45 to 90 minutes. We initiated our semi-structured interviews with statements like this one:

*UVI is developing a new secondary mathematics teacher preparation program. We realize that most of our graduates will be teaching in the VI, so we believe they will be better prepared if they truly understood the context in which they’ll be teaching. What we mean by context are things like VI history, politics, cultural values and ways of life, customs, and other common knowledge and skills. We think there may be aspects of*
teaching in the VI that are different enough from teaching in other places like Finland or Singapore or even on the mainland that make these aspects worth paying attention to.

We’re interested in what it is about this context and about these students that you believe teachers should know so that we can develop a teacher preparation program that is informed by these contextual qualities.

Then we asked them questions such as these:

1. What would you want teachers to know and be able to do?
2. What do you think is relevant? Why do you think so?
3. Do you have any ideas about how teachers might draw on this [contextual] knowledge in their classrooms?

Interviews were transcribed and scanned for salient themes (Corbin & Strauss, 2008, p. 70). Ladson-Billings’ (1995) and Malloy and Jones’s (1998) investigations of culturally relevant pedagogy informed the first iteration of coding (Corbin & Strauss, 2008; Mertens, 2005; Miles & Huberman, 1994), which was meant to capture large-grained qualities of teachers’ beliefs.

Subsequent rounds of coding were implemented to revise and refine first-pass codes in order to craft a theoretical model of a pedagogy associated with research-based models of effective teaching. We developed “Principles of Culturally Responsive Practice” by further reducing the codes that emerged from these subsequent rounds of coding. Next, we modified the “Culturally Responsive Instruction Observation Protocol” (CRIOP) (R. Powell, Cantrell, Malo-Juvera, Ross, & Bosch, 2012) so that its indicators matched the principles we identified from our analysis of the interviews. We chose the CRIOP as an observation protocol, because it was developed not only to assess culturally responsive practices, but also to serve as a framework for guiding teacher professional development in culturally responsive instruction. Next, in order to identify
evidence of their beliefs in action, this modified protocol (Appendix A) was used to structure classroom observations with seven teachers who agreed to be observed (Of those who did not, two had left the island and three did not respond to our request). These observations were followed by brief, unstructured interviews in which the observer and the teacher reflected on a selection of the teachers’ pedagogical decisions. When those were completed, we cross-referenced them with teachers’ pre-observation interviews to identify, confirm, and characterize enactments of culturally responsive practice in their classrooms. Lastly, a journal of field notes (Spradley, 1980; Van Maanen, 1988) and analytical memos (Strauss & Corbin, 1998) was maintained throughout data collection and analysis.

**Phase 2: Research Results**

Figure 1 presents the skills and dispositions that were mentioned by 20% or more participants during their interview. The horizontal axis represents the mean number of participants who provided each response. These are the skills and dispositions that were distilled into eight “Principles of Culturally Responsive Practice.” They were then organized into four of the CRIOP’s seven elements of culturally responsive instruction (the others are discourse, family collaboration, and socio-political consciousness). To be clear, these categories did not emerge from the data. Rather, they were derived from the CRIOP protocol that we used in classroom observations. Examples of enactments of these principles in classrooms are provided in the modified observation protocol (Appendix A).
Figure 1. Skills and Dispositions of Effective Teachers Mentioned by 20% or More Participants.

A. Classroom Relationships

1. Teacher demonstrates care in his or her interactions with students. Friendly and personal teacher-student relationships are essential for effective teaching.

2. Teacher confronts deficit notions of students and acknowledges that all students are able.

3. The classroom operates as a community of learners. Students are well connected to this community and also look out for each other.

B. Assessment Practices
4. Teacher uses formative assessment data throughout instruction to promote student learning.

C. Curriculum

5. Teacher plans lessons that are student-centered, inquiry-oriented, and connected to students’ lived experiences.

D. Instruction

6. Instruction is contextualized in students’ lives and experiences.

7. The teacher recognizes that many students have issues with reading.

8. The teacher attends to diversity in student ability.

One issue that was not mentioned by teachers may be as significant as those that were. In the introduction to this article we mentioned the historic pattern of under-preparation of high school graduates in the U.S. Virgin Islands for college-level work at the University of the Virgin Islands. We also stated our assumption that the responsibility for this pattern could not reside wholly within each student. This assumption was affirmed by the finding that not one teacher used deficit language to describe students. Indeed, the use of such language would be in conflict with these teachers’ caring pedagogy.

Case Studies

What follows are case studies of three teachers that demonstrate varied enactments of the eight Principles of Culturally Responsive Practice that we identified. Each case has gone through a process of member checking (Lincoln & Guba, 1985). These cases feature statements teachers made during their interview as well as the pedagogical moves they made when their classes were observed. We chose to present these three cases, due to the high fidelity between their articulated

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1 “Ability” is conceived as a function of prior knowledge, not as a function of some presumably fixed property like IQ or general intelligence (g). Otherwise, dispositions 2 and 8 would be in conflict.
CRP practices and our observations of their practice. Our observations of these teachers yielded many explicit connections to the statements they made in their interviews and depicted the interwoven nature of principles when enacted in practice. Whereas it is often difficult to recognize CRP in action, these teachers’ statements and actions matched more of the eight principles than the other teachers we observed. Also, the contrasts between these teachers’ enactments of the principles provide the reader with varied images of elements of culturally responsive practice. Numbers that appear in brackets at the conclusion of a sequence of statements indicate those statements’ alignment to an indicator as it is numbered above.

Ms. Drayton’s case will provide an image of a teachers as caring community builder. Mr. Edwards’ case will present the image of a novice but effective teacher who demands that students have greater voice and choice in a math class that also provides them with a safe environment. Finally, Mr. Wylie’s case will offer the image of a deeply caring and student-centered teacher with diverse teaching experiences and strong teacher education credentials. His case most clearly demonstrates the importance of seeing all students as able learners. His practice forefronts students’ power and agency.

Ms. Drayton

Ms. Drayton is a native of the Virgin Islands and self-identifies as African Caribbean American. She is a high school mathematics teacher who teaches at the high school from which she graduated. She had earned a Bachelor of Arts degree in Mathematics when she began teaching, but she did not receive any teacher preparation. During her first year, she was informally mentored by a colleague who had been a college classmate of hers. “Sink or swim,” is how she described her first year. “Some days were crueler than others, but I refused to sink and so I swam.” She has since earned a Masters degree in Mathematics for Secondary Education.
In her interview, Ms. Drayton indicated that she believes “respect is earned both ways, between student and teacher.” She says she’s “very strict at the beginning of the school year and softens as the year progresses.” She professes the importance of words matching actions. For example, if she warns students of a consequence for a particular behavior, it’s important for her to follow through on that consequence. She describes this disposition as “discipline with respect.” She would want new teachers to understand the importance of being honest with students and treating them equally. Ms. Drayton invites students to go jogging with her and “acts as a counselor” to them outside of class. She tells them, “I want you to exist.” She maintains communication through email and follows if students do not reply. In our observation of her class, we observed a climate of friendly interaction between Ms. Drayton and her students. She greeted them as they entered the classroom and conducted brief conversations with a handful of them. [1]

Ms. Drayton finds opportunities for students to engage in cooperative learning. She says that when students are in groups, they will not allow other students to copy off of each other or they will be dismissed from the group. She says that students are willing to intervene on another student’s behalf if that student makes a mistake, and that students make sure that all other students are caught up should any one of them fall behind. Interestingly, she notes that “the kind of communication [students] have in class… when I have them make it more cooperative-friendly, is not necessarily the same communication they have outside of class. Which is funny. They might not be friends outside of class, but they may be friends [in class] to reach the common goal for the day.” We observed this community in action when we visited her class. At one point when she was orchestrating whole-class discussion focused on a problem involving graphing an exponential equation, two students indicated that they were not sure how to begin,
two students were at the board constructing the coordinate plane, three students were collaborating to model the function with blocks, two students were constructing a table, at least three students agreed that the graph “would never reach 0,” and the entire class agreed on the location of the y-intercept. [3] Throughout the discussion, Ms. Drayton circulated around the room to monitor and respond to students’ mathematical activity. [4]

This vignette illustrates multiple forms of legitimate student participation as well as the opportunities they were provided to construct and communicate their knowledge in personally meaningful ways. [5] At the time of our visit, students had been completing a project due the following week in whatever form they found most suitable. They were writing songs, producing videos, and crafting presentations. In our interview with Ms. Drayton, she explained that “there are students who are A, B, C, D &/or F types.” However, these “types” are not fixed. She tells them, “If you are an F student and you hang around other F students, do you expect to make A’s? If you want to make better grades you need to be around those who make A’s and B’s.” Thus, by pressing students to learn from and with each other, Ms. Drayton’s class functions as a community of learners. [3] She acknowledges the diversity of her students’ knowledge while also maintaining high expectations that all of them can be successful. [2, 8]

Mr. Edwards

Mr. Edwards is a native of the Virgin Islands and self-identifies as Caribbean American or American. He holds a Bachelor of Arts degree in Mathematics and a Masters degree in Mathematics for Secondary Education. At the time we interviewed Mr. Edwards, he was in his second year of high school mathematics teaching. He had no formal teacher preparation prior to teaching.
In our interview with Mr. Edwards, he explained, “Other teachers have told me, ‘You don’t even sit at your desk.’ I sit in the chairs next to the students. I go to them. It’s kinda like the king that lives amongst the people. I think they get more respect, instead of the tyrant [who says,] ‘These are the rules of the land, follow or die.’” [1, 3] In fact, his students call him by his nickname. In our observations of Mr. Edwards’ class, we identified moves that struck us as more authoritative than authoritarian (Delpit, 1988). His commands to students to “Have a seat” and “Get your books” were expressed in the context of an apparently friendly rapport between himself and his students. When several students respectfully argued with him over the grades they received on a test, Mr. Edwards was open to hearing their arguments. He conceded to one girl, “I do owe you a point. Circle it.” [1]

Mr. Edwards recognizes that “Students do not see the benefit [of mathematics] outside the classroom. [They’re] not able to relate math to real life situations.” So he tries to impress upon them that “solving problems is a skill that is acquired from math [and is] used to solve problems in the real world.” At one point during the observation, three different students suggested that the woman pictured in a story problem was Asian. Initially, Mr. Edwards appeared to be bothered by the distraction. Eventually, however, he accommodated their request to name the girl. They agreed on ‘Lisa Marie.’ He must have realized that they, too, were distracted – perhaps by the cultural distinction. At another point in the lesson, it was evident that students had little or no interest in solving a problem in their textbook about the length of time it took to cut a wooden board. In contrast to these two situations, later in the lesson, Mr. Edwards asked students to write a story to match a graph they were given. As opposed to the wooden board problem, this problem provided students with an opportunity to make personally
meaningful connections to the mathematics. It also provided an opportunity to advance Mr. Edwards’ goal of cultivating his students’ “appreciation of mathematics.” [6]

Mr. Edwards insists that “Students must not feel restricted by where they’re from, who their parents are, or what color they are…” [2, 8] He also acknowledges that students’ fears of making mistakes inhibit their mathematical participation and development. So he emphasizes to his students that mistakes are opportunities to learn. “It is better to make them now than when you are in the field as a physician, lawyer, etc.,” he says. At one point during our observation of Mr. Edwards’ class, students were classifying datasets as qualitative or quantitative, and as univariate or bivariate. As each data set was considered, students were asked to make these determinations. Twice during the observation, Mr. Edwards encouraged students to take the time to think. “I see your hands. Take a minute. Soak it in. Don’t say it yet,” he advised. “Think about it. Hold on to it! I want you to talk to each other. Look and think.” At another point when students were asked to match containers to graphs representing the filling of those containers of time, Mr. Edwards asked, “Does the graph match the container? Do you agree or disagree? Do you want to change your mind? You agreed and disagreed many times; now where are you? Some of you didn’t have an opinion. Now what do you think?” It appears that this nonjudgmental formative assessment encouraged students to share ideas with each other and with the whole class without fear of retribution for making a mistake. Making a mistake, or “changing your mind,” was normed as a routine part of problem solving. [3, 4, 8]

Mr. Wylie

Mr. Wylie is a native of the Caribbean island of St. Kitts and self-identifies as African American. In St. Kitts he taught for four years at the elementary level, two years at the middle school level, and three years at the high school level. In the Virgin Islands he has taught middle
school for twenty years and high school for five years. He holds a Bachelors degree in Mathematics and a Masters degree in Mathematics for Secondary Education.

When asked what teachers should know in order to be prepared for effective teaching, Mr. Wylie responded, “Students have suffered too many failure experiences. They know failure, frustration, desperation. What they need is support and reinforcement, and for us to confront what are typically low expectations.” He would encourage teachers to view students “holistically.” From that perspective, students are comprised of multiple strengths and identities. In this respect, Mr. Wylie says he’s concerned about the welfare of students both inside and outside of the classroom. In the interview, Mr. Wylie recounted the story of two students who were disruptive in class. He threatened to send one of them to another teacher’s class if they did not stop. That student did not want to go, because he perceived that the other teacher did not care about students’ education. So they ceased to be disruptive.

Mr. Wylie calls on students by name. He tends to use the “collective” verb “let’s” and pronoun “we,” as in “Let’s take 15 minutes. Then we will discuss our findings.” and “Let’s look at part D. Do we get the same answer?” By inviting students to participate in whole-class discussion using prompts like, “What should I write?”, “What if we picked a different point?”, and “What have we discovered?”, he orchestrates classroom discussion so that the discourse is distributed among the students. [3, 5] The day that we observed, we witnessed Mr. Wylie monitoring students during cooperative groupwork following the whole-class discussion. “I will come around to see what you are doing,” he assures them. Similarly, with respect to summative assessments, Mr. Wylie initially records all grades in pencil so that students have additional opportunities to improve their grades. He provides both written and verbal feedback to every
student on every assignment. This verbal feedback is provided in one-on-one meetings with students where students are encouraged to ask questions about what they don’t understand. [4]

Although in the interview Mr. Wylie did not mention the importance of doing so, we witnessed “average rate of change” problems he had written that were situated in the context of the Virgin Islands. In problem solving fashion, he encouraged students to solve those problems in personally meaningful ways. The same is true for his students who are designated as “special needs.” Rather than modifying the problem according to his expectations, he thinks it’s important for students with special needs – and all students in general – to determine what they’re able to accomplish. [8]

**Phase 3: Connecting the Findings to Teachers and Teaching**

UVITeach features a model of mentorship where Mentor Teachers supervise apprentice (pre-service) teachers in their own classrooms. Mentor Teachers are classroom teachers who earn their certification by completing professional development in Summer Institutes at UVI. In July 2015, we offered a Summer Institute to 30 math and science teachers from the USVI as part of the professional development they will receive in order to become certified Mentor Teachers. This institute served as a pilot for what teacher preparation and professional development informed by our research might look like. By sending its teachers to this institute, it also demonstrated the buy-in and support of the Virgin Islands Department of Education (VIDE), who have partnered with the university to rethink their approach to STEM teacher preparation in light of historic trends of low student achievement across the territory. The VIDE realized that our research could provide a viable way forward in terms of determining how a cultural responsive pedagogy could make teaching more effective for students. This partnership is one of
the benefits of the community-based approach we’ve taken to the development of a model of culturally responsive pedagogy.

The overarching goal of the Summer Institute was to develop teachers’ capacity to act as school-based facilitators of professional learning communities. We hoped to accomplish this goal by providing teachers with a series of workshops on inquiry-based learning and project-based instruction in mathematics with connections to science and grounded in issues of equity and its relationship to a CRP. We framed that relationship as one in which a CRP is seen as nurturing equity and its many dimensions (e.g., access, achievement, identity, and power (Gutiérrez, 2009, 2012a)). We hypothesized that if we could help teachers begin to see that they can look beyond the adopted curriculum into students’ homes and communities, then they will find rich cultural resources that can be used in their classrooms to provide lessons that are likely to be meaningful to students. Facilitators from the UTeach Institute ran the morning sessions, which engaged teachers in lessons that model inquiry-oriented and project-based pedagogies. We ran the afternoon sessions, which we describe here. These sessions focused on equity issues and the construction of a CRP.

In order to develop a shared understanding of equity, teachers read an excerpt of NCTM’s Principles to Actions (National Council of Teachers of Mathematics, 2014) that identifies Equity and Access as an essential element of a school mathematics that ensures success for all students. They also viewed slides from the accompanying “Principles to Actions Professional Learning Toolkit” (National Council of Teachers of Mathematics, 2016) that provides guidance to teachers in implementing learning opportunities that affirm students’ mathematical identities and nurture their agency. Then, teachers were introduced to the concept of funds of knowledge (Moll et al., 1992) through the practitioner piece, “Mathematics
Instruction Developed from a Garden Theme” (Civil & Khan, 2001), which we thought would give them a vision of the means by which they could link mathematics curriculum and instruction with their students’ everyday experiences.

Next, we gave the teachers an excerpt from the document, “STEM Education Needs All Children: A Critical Examination of Equity Issues” (Great Lakes Equity Center, 2013), which provided teachers with images of an equity-oriented mathematics education. Four features of a culturally responsive STEM education were specified: Identity (situating students’ cultural and personal identities as competent learners in STEM activities); Responsiveness (utilizing various methods to maximize students’ opportunities to learn STEM concepts and literacies); Agency (empowers students to use STEM as tools for understanding their world and solving community and global problems); and Relevance (connecting STEM concepts to students’ lived experiences and bridging their funds of knowledge to new learning). We gave the teachers two tasks, the Green Homes Problem and the Beach Cleanup Problem, and asked them to adapt them for contextual and cultural fit with these four features in mind.

The Green Homes Project is a project-based lesson based on a mock Request for Proposals (RFP) by an organization seeking to build homes around the world that are both green and economical. This lesson was adapted over several years by a veteran teacher and department chair in St. Croix who developed an inquiry pedagogy in Summer Institutes at UVI and has been serving as a mentor to in-service teachers and to pre-service teachers at UVI. Encouraged by the school district to incorporate project-based learning into the curriculum, she modified a global-themed project she had found on the Internet to make it culturally responsive and locally relevant.

The project calls on students to develop a green home design, provide rationales for their design decisions, create a budget, and build a design prototype. Students use arithmetic, algebra,
and geometry to compute the costs of labor and materials, to determine the financial consequences of natural resource energy appraisals, and to draw blueprints accurately and to scale. In their modifications of this task, teachers also asked students to consider the benefits and availability of solar and wind energy, to contact the Department of Parks and Natural Resources to identify usable land and determine building codes for hurricane- and earthquake-proof designs, and to explore how topographical features of the USVI can influence home design.

The launch activity for what became the Beach Cleanup Problem is as follows:

You are in charge of making the box lunches for a field trip. You have $100 to spend and 30 students are going on the trip. A local restaurant will sell you extra-long submarine sandwiches at a bargain rate of $6 each. You are going to cut the sandwiches into parts and put one part in each lunch box. You will also put one juice in each box, which you can get for 50 cents each. In addition, you can buy the boxes, napkins, a box of bananas, and other supplies for a total of $25. What fraction, x, of each sandwich can you put in each box?

This problem was first modified for contextual relevance by a faculty member in the math department at UVI and included in a curriculum she created for the university’s developmental mathematics program. We drew on her experience successfully modifying this problem for contextual fit, because she had shared with us that beach cleanup situations are common contexts for learning math and science in VI schools.

In teachers’ modifications of this problem, they added a context: All over the world, people go out to clean up their beaches on the same day. It’s fun and it’s necessary. It protects habitat for marine life, helps keep our waters clean, and makes the world a better place to live in. You will be going with students to clean up the beach next Saturday morning. The teachers also developed modifications and extensions around themes such as these:

1. Determine the volume of trash in each of the following categories and construct a pie chart that displays those quantities: landfill, recyclable, biodegradable.
2. Include this condition in the problem statement: The amount of dessert each person gets is proportional to the amount of work they do. Give an example of what a proportional relationship could look like.
3. Find five pieces of garbage that appear to vary in age. Order those objects from newest to oldest and estimate the age of each one. Describe the methods you used to determine their ages. Then find another piece of garbage and compare it to your five objects to determine a good estimate of its age.

4. For some turtle species, the gender of hatchlings is determined by the temperature of the sand in which the eggs are laid. For one turtle species, eggs from nests at temperatures between 22°C and 26°C all hatch as males. If the nests are between 26°C and 30°C, they all hatch as females. These turtles tend to lay eggs from June 1st to October 31st. Use this graph of average nest temperatures to estimate the number of male and female hatchlings that will be produced from 1,000 eggs.

![Graph of average nest temperatures]

5. Find a seashell. Decompose that seashell into familiar geometric shapes such as rectangles, triangles, and circles. Write a formula that could be used to determine the surface area of the shell.

6. Find about 25 seashells. Sort them into categories so that the shells in each category share a common feature. Give each category a meaningful name that refers to the feature the shells in that category have in common. Write an application in Scratch that others can use to guide them in identifying and classifying shells they find.

An investigation of shells was particularly appealing to one teacher who noted that the shell is an iconic Caribbean cultural object. He shared that shells demonstrate fundamental arithmetic and geometric relationships in that their spiral form manifests representations of similar right triangles, the Fibonacci numbers, and the golden ratio.

When teachers realized how easy it was to brainstorm so many modifications that could be made to the task, they agreed that the Beach Cleanup Problem could serve as a canonical example to preservice teachers of how local knowledge can be used to develop culturally responsive curriculum embedded in culturally responsive teaching practices. We were
encouraged by the teachers’ modifications of the two tasks. Their work convinced us that we had established the significance of a culturally responsive curriculum.

For the concluding activity of the institute, the teachers examined our Principles of Culturally Responsive Practice. The four-feature STEM framework offered teachers critical focal points for interrogating a culturally responsive pedagogy. But since it did not provide them with explicit images of that pedagogy as it may be enacted in the V.I., we provided these principles in order to help teachers name and consider the habits and dispositions of effective, culturally responsive mathematics teachers so that they could construct mental images of cultural responsive teaching in their own community. To that end, we were sure to inform them that these habits and dispositions had been developed from our research with their colleagues in the V.I.

Then, since these teachers had experience teaching mathematics in the same geographic and cultural context in which our research project was undertaken, we convened focus groups (Bernard, 2002) in the Summer Institutes on each campus to complement our findings with their thoughts on and elaborations of the principles we identified. To mediate the possibility of deference and expectancy effects (Bernard, 2002), we asked the teachers to first record their individual thoughts on paper and then share them in small groups. Then we engaged them in whole-group discussion and took notes on our conversations. The following most substantive feedback we received contributes to the validity of our findings. Only those statements in quotes are actual quotes. The others are paraphrased from conversations we had.

- The principles suggest that teachers should leverage students’ out-of-school experiences and make connections to the issues that they bring to class, like ‘Why are the electricity costs so high?’
- “It all goes back to it being relevant to the students.”
- It’s important to provide students with some positive feedback; it may be the only positive feedback they get.
- Sometimes school is the only sanctuary kids have.
- Rather than asking, “Are they able?” we should be asking, “How are they able?”
Teachers acknowledged that we tend to leave the affective piece out of lesson planning. They believe that students want to know that their teachers care about their ideas and what’s going on with them at home. They also believe that students don’t want to let the teacher down who cares about them.

Teachers’ reflections before, during, and after the workshop activities provide a trail of documentation of their experiences throughout the institute. These are excerpts from their written reflections:

**Before.** In terms of *Classroom Relationships*, teachers expressed the importance of student-teacher interactions and getting to know students early on. In terms of *Assessment Practices*, teachers expressed the importance of asking questions throughout the lesson, making lessons relevant to students, and that answers are not simply evaluated as right or wrong but that students’ ideas are interpreted and built upon. When asked, “What should a new teacher know about educating the students we have?” the teachers suggested that new teachers focus on learning styles, differentiate instruction, be prepared to motivate students (“some are unmotivated”), make information relevant, and be aware that we have a very diverse student population in terms of ability. They also wanted new teachers to know that: “students’ background information may affect their performance,” they need to actively engage, they receive “little or no reinforcement at home,” they are “intelligent but lazy,” they have low reading skills, and they “require a lot of reinforcement of skills.”

**During.** When teachers were asked, “What ideas have stood out for you and how do you think they could inform your teaching?” several responded that it was important to engage students in assignments that are relevant to them and that they have the capacity to make connections between what they’re learning in school and what they experience outside of school. They also mentioned the value of productive struggle in mathematics problem solving, that teachers should have productive beliefs about their students, and that it is important to...
understand what equity and equality are as well as the differences between them. One teacher wrote, “The ‘Principles of Culturally Responsive Practice’ is an excellent tool for planning my lesson plans. This is a tool that I will definitely use.” Another teacher reported that “the videos [about culturally relevant pedagogy and funds of knowledge] were particularly interesting to me, especially the way in which the teacher interacted with the students: encouraging, respectful, making connections. I want to use these activities in my classroom.”

After. Teachers were again asked, “What ideas have stood out for you and how do you think they could inform your teaching?” Two teachers wrote that it was important to use meaningful contexts to leverage students’ everyday knowledge and then build the formal mathematics on top of that knowledge. Two teachers expressed the value of learning “how to infuse mathematics into the science curriculum.” And two more teachers commented on the value of creating culturally relevant extensions to the Beach Cleanup and Green Homes projects.

Worth noting, the teachers who had expressed these deficit-based views of students prior to the workshop did not express these views at its conclusion. And while we acknowledge that such views are resistant to change and may persist (Courcy, 2007; Garcia & Guerra, 2004; Sleeter, 2008; Weisman & Garza, 2002), the contrast between the dominant themes in the reflections provided before and after the workshop is nonetheless striking. These reflections conclude this section in which we described how we first connected the findings of our research to the work of teaching. Next we describe adaptations we’ve made to some of the UTeach courses for the UVITeach model.

Phase 4: The Findings Inform the Model

Our adaptations to core courses in the UTeach program are informed not only by the model of culturally responsive practice that our research yielded, but also by an
acknowledgement revealed by this research and the work of others (Civil, 2009, 2014a, 2014b; Hill, 2012; Langlie, 2008) that considerations of contextual and cultural features can have for powerful implications for mathematics teaching and learning. We describe adaptations to six of these core courses next.

*Step 1, Step 2, and Project-Based Instruction.* Students in UTeach programs are first introduced to the theory and practice behind effective inquiry-based STEM instruction in the Step 1 and Step 2 courses. These courses include a field experience where students observe teaching in an elementary and middle school classroom and are guided through the process of designing and preparing to teach lessons in those classrooms. In Project-Based Instruction, they engage in a process of investigation and collaboration using the same processes and technologies that actual scientists, applied mathematicians and engineers use. Students work in teams to formulate authentic, important, and meaningful questions, make predictions, design investigations, collect and analyze data, make products, and share ideas.

We know that developing teachers’ equity pedagogies is only a starting point for real epistemological change. Grounding these pedagogies in some conceptual foundation and providing authentic images of their enactments will do more to instill in teachers the necessary mental images of cultural responsive teaching in authentic situations (Windschitl, 2002). Although both Mentor and student teachers will have experienced some level of growth in their capacity to design new lessons that model an inquiry-oriented and project-based pedagogy with culturally responsive themes and will also have engaged with the conceptual foundations of that pedagogy in equity principles and practices through coursework or Summer Institutes, we acknowledge the complexity of creating a learning environment envisioned by such a pedagogy. Nonetheless, we anticipate that student teachers who will be developing their own model of CRP
throughout their coursework will be provided space and support to implement those lessons in the classrooms of Mentor teachers who are at least familiar with that pedagogy. The level of support that Mentor teachers will be able provide student teachers as they aim to sustain and further develop that pedagogy will be determined by the extent to which Mentor teachers have maintained an equity- and inquiry-oriented pedagogy beyond coursework and further developed it through and beyond induction in ongoing campus- and university-based professional learning communities endorsed and supported by the VIDE.

_Knowing and Learning and Classroom Interactions._ Knowing and Learning is the course that is often referred to as “the learning theory course.” The goal of the course is for students to construct a model of knowing and learning mathematics and science that will guide their future classroom practice. Worth noting, this happens to be the course that provided the first author with experiences—first as a student and then later as an instructor—that laid the groundwork of ideas upon which this project was initially conceived.

Classroom Interactions typically follows Knowing and Learning. It’s the field-based course that continues the process of preparing students to teach mathematics and science in secondary settings by providing opportunities to see how theories explored in the Knowing and Learning in Mathematics and Science course play out in instructional settings. Informed by our research, which has yielded principles of culturally responsive practice that concern classroom relationships, assessment practices, curriculum, and instruction, one of the objectives for this course now identifies equity as a major area of emphasis. That objective reads as follows:

_Observe and analyze classroom instruction and data on student participation and performance with regard to equitable and diverse instructional approaches that afford all students an opportunity to learn._ This emphasis generates curricular space for the integration of practices
that facilitate and orchestrate culturally responsive mathematical learning opportunities for the Virgin Islanders informed by the relevant research (e.g., Leonard & Guha, 2002; Malloy & Jones, 1998; Martin, 2009; Moll et al., 1992; Valenzuela, 1999; Yosso, 2005). Thus, CRP principles are embedded in Classroom Interactions, just as they are in courses across the entire UVITeach program.

*Perspectives.* The Perspectives course, which is typically taught by faculty in History or Philosophy, introduces students to the historical, social, and philosophical implications of STEM fields through investigations of significant episodes in the history of the sciences. Rather than revamping UVI’s existing History and Philosophy of Math course for math majors, faculty in the College of Social Sciences and Liberal Arts created a new course that will replace Perspectives in the UVITeach program titled, “Ethnomethodological Perspectives into Natural Sciences and Mathematical Inquiries.” This course will provide students with the opportunity to learn about ethnomathematics (d'Ambrosio, 1985, 2001; Mukhopadhyay & Roth, 2012; A. Powell & Frankenstein, 1997; Presmeg, 2007) by examining diverse forms of mathematical knowledge and practice as they are embedded in a variety of lived cultural experiences and along with their historical underpinnings. Students in the course will conduct authentic research in order to build and share local knowledge and practices that will inform a model of CRP that they will implement in their own classrooms to provide their students with rich cultural access points to the study of mathematics.

The modifications of these six core courses demonstrate how our findings are informing the UVITeach model of teacher preparation. Our presentation of these modifications concludes the fourth and final phase of our approach to developing a model of culturally responsive
mathematics pedagogy for the U.S. Virgin Islands. We now move on to situate the development of this pedagogy in light of the issues we raised early on.

**Discussion**

Because learning takes place in social and cultural settings, the interaction between culture and learning is at the core of a theory of culturally responsive pedagogy. As such, the adoption of new curricular materials and experiences should accompany an interrogation of cultural resonance between those materials and experiences and the context in which they are to be adopted. Then, should any dissonance be identified, a determination must be made as to whether and how that model should be adapted. Our prior knowledge of the UTeach model of teacher preparation and our new knowledge of the V.I. context and culture suggested such dissonance, so we undertook this project in order to adapt it.

A review of the literature suggested that an understanding of community cultural wealth and funds of knowledge could help us identify cultural and contextual resources specific to the U.S. Virgin Islands that have potential utility for informing teachers’ pedagogy. By identifying teachers who had been seen as effective in the area of mathematics teaching, interviewing them, and observing their classroom teaching, we captured some of this local knowledge and were able to see its relationship to teaching. We identified eight Principles of Culturally Responsive Practice that comprise a model of effective mathematics teaching in the region. These principles concern the skills and dispositions of effective mathematics teachers in terms of classroom relationships, assessment practices, curriculum, and instruction.

We are not suggesting that the Principles of Culturally Responsive Practice that we have identified are entirely new. Taken out of cultural context, many are not. While they do replicate and build on the prior work of others who had similar intentions (e.g., Ladson-Billings, 1995;
identifying them in the practices of teachers in the U.S. Virgin Islands is new. Furthermore, we suggest what might be an even more salient takeaway is that this research yields a viable methodology for developing a community-based model of CRP that can be used to inform teacher education programs that take culturally generic approaches to responsive pedagogy. Taking a community-based approach ensures that teachers are better prepared understand and leverage their students’ particular sociocultural and contextual knowledge as a resource (Moschkovich, 2013; Stroup, Ares, Hurford, & Lesh, 2007) toward effective teaching. This methodology joins existing efforts to develop experiences for pre-service teachers that foreground issues of equity (Gutiérrez, 2012b; Strutchens et al., 2012) and promote culturally responsive mathematics teaching practices (e.g., Aguirre, Zavala, & Katanyoutanant, 2012; McLeman & Vomvoridi-Ivanovic, 2012; Tate, 1995; Turner et al., 2012).

**Conclusion**

Given the increasing cultural diversity of the student population in schools, it is critical that teachers are prepared to understand, engage, and leverage this diversity toward effective teaching. In particular, novice teachers face monumental challenges as they navigate the complexities of inquiry-oriented teaching, especially in relation to issues of equity and diversity. These teachers can be better prepared to navigate and resolve these challenges by coming to understand the relevance to teaching of culture and context in general, and also in relation to the specific culture and context in which they will teach. Thus, the development of a culturally responsive pedagogy that is foundational to teacher preparation coursework and experiences can be seen not only as essential to making culturally responsive practice even more accessible to these teachers but also as critical in fostering the kind of systemic reform that their students deserve. For these reasons, the methodology we propose for developing a pedagogy that is
responsive to the culture and context in which pre-service teachers will ultimately teach and then aligning that pedagogy to teacher preparation coursework and experiences should be useful to mathematics teacher educators at any institution that prepares teachers.

References


Gutiérrez, R. (2009). Framing equity: Helping students “play the game” and “change the game.” *Teaching for Excellence and Equity in Mathematics, 1*(1), 4-8.


The University of Texas at Austin: College of Natural Sciences. (n.d.). Uteach: We prepare teachers. They change the world. Retrieved from https://uteach.utexas.edu/


APPENDIX A

UVI Noyce Classroom Observation Protocol
Adapted from the Culturally Responsive Instruction Observation Protocol (CRIOP)*

School: ____________________  Teacher: ________________________________

Observer: ____________________  Date of Observation: _______  # of Students in Classroom: __________

Academic Subject: _________________  Grade Level(s): _________________

Start Time of Observation: _______  End Time of Observation: _______  Total Time of Obs: __________

DIRECTIONS

The following pages contain indicators to direct your attention to particularly aspects of classroom instruction. These are informed by the literature relative to culturally responsive instruction and also by the findings of our own study.

There is probably not enough room in the “Field Notes” cells, so I suggest you have extra paper handy to record those notes. The categories of indicators, as well as each indicator, are numbered for your convenience.

NOTES
I. CLASSROOM RELATIONSHIPS

<table>
<thead>
<tr>
<th>CRI Indicator</th>
<th>For example, in a responsive classroom:</th>
<th>For example, in a non-responsive classroom:</th>
<th>Field notes</th>
</tr>
</thead>
</table>
| 1. *Teacher demonstrates care in his or her interactions with students. Friendly and personal teacher-student relationships are essential for effective teaching.* | Generally Effective Practices:  
  - Teacher refers to students by name, uses personalized language with students  
  - Teacher conveys interest in students’ lives and experiences  
 Practices that are Culturally Responsive:  
  - Teacher differentiates patterns of interaction and management techniques to be culturally congruent with the students and families s/he serves (e.g., using a more direct interactive style with students who require it) |  
  - Teacher promotes negativity in the classroom, e.g., criticisms, negative comments, sarcasm, etc.  
  - Teacher stays behind desk or across table from students; s/he does not get “on their level”  
  - Teacher does not take interest in students’ lives and experiences; is primarily concerned with conveying content  
  - Teacher uses the same management techniques and interactive style with all students when it is clear that they do not work for some | |
2. **Teacher confronts deficit notions of students and acknowledges that all students are able.**

<table>
<thead>
<tr>
<th>Generally Effective Practices:</th>
<th>Practices that are Culturally Responsive:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• There is an emphasis on learning and higher-level thinking; challenging work is the norm</td>
<td>• There is a “family-like” environment in the classroom and there are group goals for success as well as individual goals; every student is expected to achieve</td>
</tr>
<tr>
<td></td>
<td>• Students are invested in their own and others’ learning</td>
</tr>
<tr>
<td></td>
<td>• Teacher expects every student to participate actively and establishes structures (e.g., frequent checks for understanding) so that no student “falls through the cracks”</td>
</tr>
<tr>
<td></td>
<td>• Teacher bases feedback on established high standards and provides students with specific information on how they can meet those standards</td>
</tr>
<tr>
<td></td>
<td>• Teacher has low expectations (consistently gives work that is not challenging)</td>
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<tr>
<td></td>
<td>• Teacher does not call on all students consistently</td>
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<tr>
<td></td>
<td>• Teacher allows some students to remain unengaged, e.g., never asks them to respond to questions, allows them to sleep, places them in the “corners” of the room and does not bring them into the instructional conversation, etc.</td>
</tr>
<tr>
<td></td>
<td>• Teacher does not establish high standards; evaluation criteria require lower-level thinking and will not challenge students</td>
</tr>
<tr>
<td></td>
<td>• Teacher feedback is subjective and is not tied to targeted learning outcomes and standards</td>
</tr>
<tr>
<td></td>
<td>• Teacher expresses a deficit model, suggesting through words or actions that some students are not as capable as others</td>
</tr>
</tbody>
</table>
3. **The classroom operates as a community of learners. Students are well connected to this community and also look out for each other.**

<table>
<thead>
<tr>
<th>Generally Effective Practices:</th>
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</thead>
<tbody>
<tr>
<td>• The teacher implements practices that teach collaboration and respect, e.g., class meetings, modeling effective discussion, etc.</td>
<td>• Students are not encouraged to assist their peers</td>
<td></td>
</tr>
<tr>
<td>• Students are continuously viewed as resources for one another and assist one another in learning new concepts</td>
<td>• Students primarily work individually and are not expected to work collaboratively; and/or students have a difficult time collaborating</td>
<td></td>
</tr>
<tr>
<td>• Students are encouraged to have discussions with peers and to work collaboratively</td>
<td>• Teacher dominates the decision-making and does not allow for student voice</td>
<td></td>
</tr>
<tr>
<td>• Students support one another in learning and applying new concepts to assure that every student succeeds</td>
<td>• The emphasis is on individual achievement</td>
<td></td>
</tr>
<tr>
<td>• Chairs/desks are arranged to facilitate group work and equal participation between teachers and students</td>
<td>• Classroom is arranged for quiet, solitary work, with the teacher being &quot;center stage&quot;</td>
<td></td>
</tr>
</tbody>
</table>

**II. ASSESSMENT PRACTICES**

<table>
<thead>
<tr>
<th>CRI Indicator</th>
<th>For example, in a responsive classroom:</th>
<th>For example, in a non-responsive classroom:</th>
<th>Field notes</th>
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</thead>
<tbody>
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</tbody>
</table>
1. **Teacher uses formative assessment data throughout instruction to promote student learning.**

   **Generally Effective Practices:**
   - Teacher modifies instruction or reteaches when it’s clear that students are not meeting learning targets
   - The goal is student learning, and formative assessment data is used throughout the lesson to adjust instruction in order to assure that every student learns

   **CRI Indicator**
   - For example, in a responsive classroom:
   - For example, in a non-responsive classroom:
   - Field notes

---

**III. CURRICULUM/PLANNED LEARNING EXPERIENCES**

- Teacher follows the lesson script even when it's clear that students are not meeting learning targets
- The goal is to get through the lesson and cover the content versus assuring student understanding
1. **The teacher plans lessons that are student-centered, inquiry-oriented, and connected to students' lived experiences.**

<table>
<thead>
<tr>
<th>Generally Effective Practices:</th>
<th>Culturally Responsive:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Materials and real-world examples are used that help students make connections to their lives</td>
<td>• Materials and examples are used that reflect diverse experiences and views</td>
</tr>
<tr>
<td>• Learning experiences build on prior student learning and invite students to make connections</td>
<td>• Families’ “funds of knowledge” are integrated in learning experiences when possible</td>
</tr>
<tr>
<td>• No attempt is made to link students’ realities to what is being studied; learning experiences are disconnected from students’ knowledge and experiences</td>
<td>• Skills and content are presented in isolation (never in application to authentic contexts)</td>
</tr>
<tr>
<td>• Learning experiences are derived almost exclusively from published textbooks and other materials that do not relate to the classroom community or the larger community being served</td>
<td>• Families’ particular “funds of knowledge” are never called upon during learning experiences</td>
</tr>
<tr>
<td>• Teacher follows the script of the adopted curriculum even when it conflicts with her own or the students’ lived experiences</td>
<td>• Learning experiences are derived almost exclusively from published textbooks and other materials that do not relate to the classroom community or the larger community being served</td>
</tr>
</tbody>
</table>
## IV. PEDAGOGY/ INSTRUCTIONAL PRACTICES

<table>
<thead>
<tr>
<th>CRI Indicator</th>
<th>For example, in a responsive classroom:</th>
<th>For example, in a non-responsive classroom:</th>
<th>Field notes</th>
</tr>
</thead>
</table>
| 1. *Instruction is contextualized in students’ lives, experiences, and individual abilities.* | Generally Effective Practices:  
• Learning tasks and texts relate directly to students’ lives outside of school  
• Learning activities are meaningful to students and promote a high level of student engagement  
Practices that are Culturally Responsive:  
• Teacher builds on existing cultural knowledge and “cultural data sets”  
• Instruction is culturally congruent with students’ culture and experiences | • Learning tasks and texts reflect the values and experiences of dominant ethnic and cultural groups  
• Learning activities are decontextualized from students’ lives and experiences | |
| 2. *The teacher recognizes that many students have issues with reading.* | • There is an emphasis on learning academic vocabulary in the particular content area  
• Students are taught independent strategies for learning new vocabulary  
• Specific academic vocabulary is introduced prior to a study or investigation  
• The teacher provides many opportunities for students to use academic language in meaningful contexts | • Little attention is paid to learning academic vocabulary in the content area  
• New words are taught outside of meaningful contexts  
• Students are not taught independent word learning strategies | |
| 3. **The teacher attends to diversity in student ability.** | • Teacher uses a variety of teaching strategies to assist students in learning content (e.g., demonstrations, visuals, graphic organizers, modeling, etc.)  
  • Teacher models, explains and demonstrates skills and concepts and provides appropriate scaffolding  
  • Students apply skills and new concepts in the context of meaningful and personally relevant learning activities | • Teacher primarily uses traditional methods for teaching content (e.g., lecture, reading from a textbook) with few scaffolding strategies  
  • Teacher does not always model, explain and demonstrate new skills and concepts prior to asking students to apply them  
  • Students practice skills and reinforce new concepts in ways that are not meaningful or personally relevant to them |