Title: Moving Culturally Relevant Pedagogy From Theory to Practice: Exploring Teachers’ Application of Culturally Relevant Education in Science and Mathematics  
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We know that it’s easier to know the theory behind CRT, CRP, and CRE than it is to implement these concepts into a classroom in practice. We already know that instruction in education needs to reflect both cultural nuances and distinct cognitive nuances. We also know that cultural relevance is just as important in STEM education as it is in English, history, or any other subject. Therefore, in order to improve CRE, it’s important that teacher education programs also teach using CRE.

There are many ways in which STEM can be made culturally relevant. In this article, cognitive apprenticeship in combination with CRE is the framework of choice.

The different steps in cognitive apprenticeship are as follows; first, students should be taught in the context of problems that are meaningful. These are called contextual problems. Second, a teacher should model solutions to these problems. Third, students should start trying to complete their own activities and problems while being coached by a teacher and each other. Last, Students should be able to solve problems on their own with minimal help from a teacher, using their new skills. This is considered the scaffolding phase. Cultural relevance can be implemented in each phase, but especially in this last phase, students are able to explain and solve problems in culturally and socially relevant ways. The modeling phase often seems to be done by watching a video or completing a reading about the problem presented in phase one.

In this study, teachers were surveyed about their knowledge and skills in culturally relevant teaching before and after professional development. Initially, it seems that many teachers know what it is, but don’t know exactly how to implement it in practice.

At the outset, teachers believed CRE meant teaching while using a curriculum that focuses on learning about/around students’ cultures, experiences, and the things they can understand based on their backgrounds and showing them all how things they learn are useful in real life. They also believed there needed to be a focus on their interests and on what engages them.

This translated into practice by means of using real life examples or teaching in locations other than the classroom and by integrating student interests after specifically asking for them.

Some topics teachers used include shoes and gift cards for a math problem (it’s a superficial topic, but was of particular interest to the students), a science/math lesson about creating inexpensive habitats for pets and affordable pets, a lesson about the water cycle using the California drought as an example, and a lesson on purchasing Icee’s to learn about properties of matter.

Once teachers were able to implement the four phases of cognitive apprenticeship, teachers included activities such as playing a game in which they had to act out different parts of plants, playing charades to act out what might happen to different plant parts if there was a water drought, and having students explain to one another what sediment and erosion are and how these would impact the city in which the students live. Overall, the application of CRE gets more dynamic after professional development about the topic.

Key Terms

* Culturally Relevant Pedagogy (CRP): A framework that focuses on cultural difference between students as well as students and teachers. This way of teaching and learning allows students to move from a more passive role to an active one in which they obtain meaningful knowledge that can make them into social justice agents.
* Culturally Responsive Teaching (CRT): A framework within education that helps teachers make whatever they are teaching more relevant for students by connecting the curriculum to students’ personal experiences and cultures. It’s a form of assets-based instruction in which students as well as teachers are encouraged to value their cultures.
* Culturally Responsive Education (CRE): A theory-to-practice framework that is a combination of CRP, which consists of macro-scale paradigmatic thinking, and CRT, which is a more classroom focused approach
* Cognitive apprenticeship: A contemporary framework which provides a model for how learning occurs within the context of interactions that are meaningful. This framework is a model consisting of four phases in which a teacher conveys their skills to their students. These four phases are contextual problems, modeling activities, coaching activities, and scaffolding activities.