

Exploring Math Identity and Cultural Perspectives Through Narrative Math Games

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Students at a Tribal College or University (TCU) can be said to have a “home and family culture that does not fully resonate with that of school and the wider society (Bishop, 1991).” Frequently, attempts to improve math education for these students look at improving access to better math instruction in order to increase achievement. This is the “dominant axis of equity (Gutiérrez, 2012).” Is it possible that using the critical axis, identity to power, math instruction can help TCU students leverage their cultural identities?

Purpose of the Study

The purpose of the study is to examine the mathematical identities of students in a mathematics class at a Tribal College. The mathematics class employs a culturally relevant technology game based on the units of the mathematics reasoning course. The mathematical identities of college students shape their perspectives on their capacities as mathematics learners and persistence in STEM fields. (Cribbs, Mantone, & Piatek-Jimenez, 2015) These mathematical identities are tied to students’ sense of belonging in the mathematics class, and to the field of mathematics itself. Researchers have found that mathematics instruction that is culturally relevant, in this case to indigenous culture, increases students’ sense of belonging and positive mathematics identities. (Matthews, 2014)

The mathematics class under study aims to provide mathematics students with a culturally relevant experience in part through a technology game. The game is to provide students with mathematical experiences that are embedded in a narrative around activities that are specific to the Mi'kmaq tribal communities. The game is set in the historical period of the late 1500s, and the activities include building a birch bark canoe and learning navigation skills. (Bahar, 2019) As the students engage in the games, they interact with certain tasks along the way that include both mathematics and cultural content. They are also prompted to reflect on their experiences as they play the game, including their relationships with the mathematics and with the cultural activities.

Methods

This study is being conducted at a tribal college in the upper Midwest. The students are taking a math reasoning class and part of the curriculum is the game. The study employs a qualitative methodological approach to study the students’ engagement in the mathematical games and the kinds of mathematical identities they are developing as a result. Students will be asked to complete a survey that asks about their attitudes and expectations in a math setting. We will also interview a sampling of the participants to get more open-ended responses.

Potential Impacts

The study aims to counter existing narratives about what math is and who can do it that tend to limit the participation of certain communities in mathematics. For the tribal college community, this research will reveal the importance of culturally relevant mathematics instruction. The resultant technology will be made available for other TCU’s to review and potentially adopt.

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