Signs of power and dominance: Mathematics curricula in Indian boarding schools, 1879–1932

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This project examines an unexplored area of scholarship in the United States: mathematics education in Indian boarding schools, 1879–1932. The aims of this research include 1) contributing to historical analysis of the role of mathematics education in the U.S. colonial curricula and 2) increasing our understanding of the origins of contemporary mathematics education policy and practices. Theoretically, we argue that the systemic inequality and oppressive practices in mathematics education today are traced to U.S. assimilationist policies and thus rooted in the legacies of colonization and white supremacy. Using archival methods, we examine the history of mathematics instruction for Native youth in federal boarding schools. Finally, we discuss implications for contemporary mathematics education.

Description of the project

We recently launched a historiographic project that intersects mathematics education, educational history, and Native American studies. This interdisciplinary project examines an unexplored research area: mathematics education in Indian boarding schools (IBS) during 1879-1932 (assimilation era of federal Indian policies). U.S. historians have examined the assimilationist policies and practices of IBS; however, little work discusses the significance of mathematics education in these colonial institutions. Using archival methodology and interpretive approaches, our scholarship examines the history of mathematics instruction for Native youth in the federal boarding school system. We seek to develop a theoretical understanding of mathematics education as a colonial assimilatory project and its impact on the experiences of Native students attending IBS during that period. Exposing the powerful undercurrents of assimilation, colonization, and white supremacy running through the history of mathematics education in the U.S. and globally has implications for approaching future research on culturally sustaining pedagogies, specifically Native epistemologies and pedagogies focused on mathematics content.

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Research questions and significance of the project

- How did the mathematics curriculum in Indian boarding schools during 1879-1932 promote U.S federal assimilationist goals?
- How did the mathematics curriculum in Indian boarding schools institutionalize Eurocentric epistemologies and enforce U.S. citizenship and values?

In the United States, there is increased attention on Black and Latinx students in the mathematics-education literature. However, limited research exists for Native youth. As mathematics curricula "appear" unbiased, impartial, and apolitical (Bishop, 1990; d'Ambrosio, 1985), research on mathematics curricula as a colonial tool could illuminate how assimilationist discourses and practices continue for Native students and other underrepresented groups in the United States.

Whereas previous scholarship has examined other curricular areas within U.S. boarding schools, such as art education (Lentis, 2017), little research has been done on the history of mathematics curricula. For example, in the *Handbook on the History of Mathematics Education* (Karp & Schubring, 2014), none of the American chapters mention mathematics curricula in IBS. This omission in the literature is startling since mathematics was always included as a priority in the global colonial project (Bishop, 1990). In the United States, the Civilization Fund Act of 1819 provided funding to Christian missions to "civilize" Native children by "teaching [them] reading, writing, and arithmetic," and mathematics content also appears in the 1901 publication, *Course of Study for Indian Schools*, which was acclaimed for unifying the curricula across different federal Indian schools (see below). Our research begins to fill this gap in the literature while building on global Indigenous scholarship (e.g., Meany, 2020; Meyer & Aikenhead, 2021; Nutti, 2013; Parra & Trinick, 2018).

Conceptual framework: U.S. colonization, White supremacy, and mathematics

Horsman (1981) argues that the "American Anglo-Saxon" conceived of themselves as "a separate and innately superior people who were destined to bring good government, commercial prosperity, and Christianity to the American continents and the world" (p. 2). Our project is informed by scholars arguing that the dominant models of mathematics education function as racial projects within white supremacist structures (e.g., Gutiérrez, 2019; Martin, 2013). Monica Miles and her colleagues (2019) observe: "In mathematics in particular, Eurocentrism—in both epistemology and pedagogy—dominates, requiring students to conform to White ways of knowing and learning" (p. 105). The application of the IBS mathematics curriculum shows the distinct ways schooling is a form of white supremacist power and human dominance.

Utilizing TribalCrit (Brayboy, 2005) and Safety Zone Theory (Lomawaima & McCarty, 2006), we conceptualize contemporary mathematics education as the ongoing legacy of the U.S. colonial project of forced assimilation. During the federal Indian assimilation policy period and our period of study (1879–1932), the metaphoric safety zone of "allowable cultural

expression" (Lomawaima & McCarty, 2006, p. 5) had a diameter nearly at "0," in which "Indian-ness" was extracted and replaced with subservience to American citizenry. During the assimilation period, mathematics education at IBS did not include Indigenous knowledges (Holm et al., 2003) and instruction was for subservience in the manual labor market. The expectations for learning arithmetic are reflected in the following excerpt from the *Course of Study for Indian Schools*, published by the Office of Superintendent of Indian Schools in 1901:

> Let all problems be practical and so simple that the child has no difficulty in stating them before he performs the operation. Aim at only reasonable facility on the part of the child, but he must be accurate. All exercises in fractions and percent should be confined to small numbers and to subjects likely to come within the pupil's experience. Number work involving a labored [sic] process of reasoning as in "catch examples" should be discarded. (p. 42)

Policymakers and practitioners conceived of mathematics education imposed through the IBS to be innately superior as they attempted to extirpate "Indian-ness."

In the contemporary period, educational scholars have argued that liberal mainstream schooling for minoritized students functions as de facto assimilation (e.g., Paris & Alim, 2017), where the language and practices around academic learning employ English-only policy, reproduce cultural erasure, and inscribe dominant values and ideology rooted in whiteness and colonization. The de facto assimilation within contemporary schooling has not progressed far from the explicit assimilation policies enacted through the IBS. We hypothesize that both oppressive and "safe" policies and practices in contemporary mathematics education for Native students can be traced to early federal assimilationist policies. This period of mathematics education has implications also for math instruction for students of color as schooling and educational practices are also tied to this history.

History of boarding schools in the United States and their curriculum

In the late nineteenth century, the United States designed Indian boarding schools as a "civilization" project (Child, 1998). Their curricular model consisted of half a day of instruction in reading and mathematics and the remainder was manual labor. Previous research on IBS has focused on policies, sports and athleticism, and students' social and emotional experiences. The government developed a "Uniform Curriculum" in the early 1900s (Lomawaima & McCarty, 2006); however, research on the implemented mathematics curricula during 1879-1932 is non-existent. By the 1920s, teachers and school administrators developed local curricula while following federal guidelines. For example, Chilocco's curriculum differed from Haskell's because of their distinctive missions (agricultural vs. industrial training), but all integrated Christianity as part of their plan to "save" and "civilize" Native children. This project will contribute to the literature on Indian boarding schools by investigating the significance of mathematics in the assimilationist mission.

Archival methods: Analysis of IBS mathematics curricula

We have started a historiography of mathematics education in six Indian boarding schools, between 1879-1932: Carlisle Indian Industrial School, Pennsylvania (1879–1918); Chemawa Indian School, Oregon (1880–present); Chilocco Indian School, Oklahoma (1884–1980); Haskell Indian Industrial Training School, Kansas (1884–present); Phoenix Indian School, Arizona (1891–1990); and Sherman Institute, California (1892–present). This list was generated based on IBS historiography, geographical diversity, and well-documented secondary sources, which can enhance connections between our findings and previous scholarship. The U.S. Bureau of Indian Affairs operated dozens of off-reservation boarding schools between 1879–1932; we narrowed our project to six with the intent of expanding the list in the future. Specific analysis methods, examples of archival data (e.g., policy documents, photos of mathematics class, etc.), and preliminary findings will be provided in our presentation.

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