Investigating African American Students’ Identity and Agency in a Mathematics and Graphing Calculator Environment at a Low-SES School

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Dissertation Abstract

The aim of this study was to investigate African American students’ identity construction (racial, mathematical, technological and otherwise), how these identities shape each other, and the sense of agency exhibited in the process within the figured worlds of mathematical learning. In doing so, I used a variety of methods including classroom observations and interviews (which included a task-based interview). To examine in depth the issues of identity and agency among African American students and how they impacted the students’ mathematical learning, I focused on five key informants. The stories told by these key informants helped illuminate their sense of identity and agency that they developed and enacted within the figured worlds that they participated.

The results of this study revealed that all the participants seemingly had positive racial identifications, and were aware of the constraints and the social devaluation that face African Americans in the society. They, however, differed in their interpretation and negotiation of these constraints and the sense of agency they exhibited in the process that influenced their opportunities to participate in mathematics and hence their mathematical identities. While having strong, positive group identification and awareness of African American devaluation and barriers shaped the high-achiever’s mathematics identity positively, it seems to have negatively impacted the low-achievers. Additionally, how students positioned themselves and authored their mathematics identities was influenced by how they negotiated the classroom norms and the constraints and affordances in the figured world of the mathematics learning in which they participated.

In solving the mathematical tasks, the participants’ modes of interacting with the graphing calculator technology were influenced by how and when they chose to use the graphing
calculator. They were also influenced by how well they blended their mathematical and graphing calculator knowledge base that allowed them to interpret the graphing calculator output and judge it against the pertinent mathematical criteria. Finally, the study also revealed that certain practices like tracking, which perpetuate the disproportionate failure of African American students in school, cause schools to mirror the social structure and organizational patterns of the inequities prevalent in society.