Chapter 4

Attending to Student Motivation through Critical Practice: A Recommendation for Improving Accelerated Mathematical Learning

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ABSTRACT

The authors discuss the relationship between math course placement policy in the United States and education inequity. Recent efforts to enroll more students in early Algebra aim to increase equity, meet 21st century goals, and close international achievement gaps. Research assessing the effects of these movements indicates that progress towards these goals has not been met. To broaden opportunities to learn in mathematics, educators must critically attend to student motivation to accommodate classroom diversity and to increase students’ effort, persistence, and choice to pursue mathematical learning. The objectives of this chapter are to: (a) discuss how Algebra policy revisions have fallen short of reaching their intended goals, (b) argue that educators must attend to student motivation to aid progress towards these goals, (c) deliver tools for educators to engage in critical analysis of motivation, and (d) provide critical practices to cultivate student motivation for mathematics. Future research directions and policy and support recommendations conclude.

INTRODUCTION

“It is better for the victims of injustice not to recognize themselves as such.” Paulo Freire, Pedagogy of the Oppressed

Injustice in the form of unequal access and persisting achievement gaps has been a catalyst for revising educational policy. One way in which school structures perpetuate societal injustice and unequal access among American students is through math course placement policies beginning in middle and/or secondary school. Course placement policies for mathematics courses have received special attention because math is the only academic subject area with a distinct sequence of courses consistent throughout the country (Adel-
man, 1999). Math courses in U.S. schools are sequenced hierarchically, where success in one course leads to enrollment in the next, higher-level course and so on. This sequence begins with algebra, a course that serves as the critical gatekeeper to higher-level mathematics because it starts the path to more advanced training in math and science.

A student who does not take algebra by the ninth grade of high school, for example, faces a blocked pathway to upper level mathematics courses such as calculus. Because the highest math course taken in high school predicts later achievement (Bishop, 1992; Murnane, Willett, & Levy, 1995), inequalities in access to algebra undermine the goals of social justice and equality. Concerns about the role academic tracking plays in perpetuating social inequality (Balfanz, Legters, & Jordan, 2004; Oakes, 2005); efforts to meet 21st century needs by progressing a national initiative to strengthen a Science, Technology, Engineering, and Mathematics (STEM) workforce (Larson, 2012); and increasing American students’ global standing in achievement have lead to policy initiatives to accelerate U.S. mathematics curricula, specifically by placing more students in algebra by eighth grade.

Educators and students must become aware of the present situation, and they must understand the constructs and power structures within our society that inform education policy. By recognizing potential oppression, educators can begin work towards reinforcing and supporting structural change in education so as to increase justice for all students and to meet national goals. Educators must question how revising educational policy impacts classroom cultures. Inequality, ideology, and policy changes alter the classroom and student learning; when educators understand this change it can lead to the strongest potential of education (Shor, 1992). Instructors find the ingredients of the culture that will be perpetuated with the study materials they use (Dewey, 1985). Therefore, if this material is changed, the educator must take advantage of these changes to generate a socially just culture.

As educational policy shifts, student and algebra classroom cultures shift as a result. Educators are then faced with an influx of students with mixed levels of prior mathematical knowledge, with greater variance in learning styles, and with greater schemes of within group differences. While attending to diverse learners is attractive because it addresses equity of opportunity, classrooms with heightened within-group differences are likely to fall short of succeeding unless teachers address learner variance (Gamoran & Weinstein, 1995). Equal opportunity becomes a reality only when students receive instruction suited to their varied readiness levels, interests, motivational beliefs, and learning preferences (McLaughlin & Talbert, 1993; Tomlinson et al., 2003). Teachers who can differentiate instruction to diverse learners by attending to variance in students’ motivation can impact students’ academic success and achievement. Furthermore, when educators cultivate student motivation, students exhibit higher levels of engagement, effort, persistence and perseverance; a greater sense of reward when completing academic tasks; greater evidence of creativity and interest; a higher degree of autonomy and increased use of cognitive strategies; and the subsequent choice to pursue learning in the related domain (Collins & Amabile, 1999; Schunk, Pintrich, & Meece, 2008).

In this chapter we argue that progressive teachers must address student motivation for mathematics to counter inequalities that persist in classroom-based curricula and policy initiatives (McLaren, 2003). To foster motivation in math, educators must pay attention to the diverse motivational beliefs of students, assess and reflect on these beliefs, and develop differentiated and critical instructional practices that lead to motivationally adaptive classroom cultures. The objectives of this chapter are to: (a) highlight