Chapter 3
Integrating Media Literacy Into Mathematics:
A Possible Solution to Inequity in Mathematics Instruction

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ABSTRACT

A disconnect between the content taught in mathematics classroom and the skills young adults need for future success has created need for more diverse pedagogy. Media literacy and mathematics communities agree on similar goals for students to access media, evaluate it, and produce their own. Through the use of progressive instructional techniques, specifically involving media literacy, educators can simultaneously address overlooked equity concerns in mathematics. Research has found that these techniques can help students by holding them to high standards, support math thinking and language development, draw on students' prior knowledge, value their communities, and solve real-world problems that they will be facing in the future. Practical suggestions and expert advice for implementing more progressive pedagogy are included. Issues and solutions to infuse new methods into the classroom are outlined along with future research suggestions.

INTRODUCTION

There has been a marked disconnect between instruction under current educational policy and the needs of employers and students. An article from a New York Times author recently opined that, "American employers want higher-order skills, and American teenagers want more interesting work" (Ripley, 2014). The World Economic Forum (2018) noted the top ten skills in demand include: analytical and critical thinking, complex problem solving, active learning, leadership, and emotional intelligence, among others. Rotherham and Willingham (2009) argued that skills such as these, coined '21st century skills', are not new skills, but instead are skills that have not been deliberately and effectively taught in schools. Through recent educational policy changes and the dissemination of the Common Core State Standards

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(CCSS), there has been an increased focus in reading, writing, and critical thinking skills across all subject areas, but there are critics that believe that American education still lacks these real-world skills as they apply to mathematics (Adams, 2014; Felton, 2014a, 2014b; Nemko, 2014; Ripley, 2014; Roh, 2003; Rotherham & Willingham, 2009).

A disconnect between needed skills and instruction continues to widen with the increased focus on accountability and high-stakes assessments. This sentiment has also been expressed by teachers, "Among mathematics educators, there is a growing recognition that a serious mismatch exists (and is growing) between the low-level skills emphasized in test-driven curriculum materials and the kind of understanding and abilities that are needed for success beyond school" (Lesh & Zawojewski, 2007, p. 764). With increased accountability, educational policies from the beginning of the 21st century to today have also focused on accessibility and equity for all students (Ravitch, 2010). This includes *No Child Left Behind*, Race to the Top (RTTT), and the *Every Student Succeeds Act* (Robinson & Harris, 2014; USDOE, 2010; USDOE, 2018). With regards to mathematics, the National Council of Teachers of Mathematics (NCTM) upholds that Common Core State Standards for Mathematics (CCSSM) have focused on more traditional math skills, while also emphasizing a deeper understanding of math procedures and concepts (Dossey, McCrone, & Halvorsen, 2016). Due to the focus on assessments and accountability of teachers and schools, however, traditional teaching pedagogy remains a dominant practice in classrooms (Ellis & Berry, 2005; Stanic & Kilpatrick, 1992; Whitney, 2016). Teachers continue to be the 'sage on the stage', disseminating procedures and skills and then provide students time to work on problems independently, to gain mastery of a given method (Ellis & Berry, 2005; Klein, 2003).

More progressive instructional pedagogy has resurfaced in direct response to increased accountability and assessment. Initiatives such as media literacy align directly with more progressive pedagogy as it relates to mathematics. As defined by Aufderheide (1992) and maintained as the definition today (Bulger, 2012; Weninger, 2018), a media literate person should be able to, "decode, evaluate, analyze, and produce both print and electronic media" (Aufderheide, 1992, p. 9). Similarly defined, progressive math tasks and activities reflect the development of similar skills including: working on authentic problems, collaborative work, critical thinking, evaluating information, analyzing methods, and producing solutions. (Bell, 2010; English & Mousoulides, 2015; Erickson, 1999; Hamilton et al., 2008; Lesh & Harel, 2003; Rotherham & Willingham, 2009; Roh, 2003; Thomas, 2000). Skills needed by future employers align with these progressive teaching strategies by providing students opportunities to understand, evaluate, and create authentic media.

While these teaching strategies have gained popularity, they have not been specifically aligned with CCSSM and Mathematical Practices (Common Core State Standards Initiative, 2018; Larmer & Mergendoller, 2010; Lesh, Sriraman, & English, 2014; Marshall & Sensoy, 2011; Gutstein, 2003), have not been widely adopted and regularly utilized by teachers (Ellis & Berry, 2005; Hobbs, 1998; Rotherham & Willingham, 2009; Whitney, 2016), nor have been researched consistently (Boaler, 1998; Hamilton et al., 2008; Lesh et al., 2014; Schoenfield, 2004; Sriraman & English, 2010; Stein & Prewett, 2009; Stohlmann & Albarracin, 2016). Lubienski (2007) noted, "the relative lack of attention to ethnicity and class is particularly striking in light of the fact that U.S. mathematics achievement gaps related to race and socioeconomic status are roughly 10 times the size of gender gaps (p. 11).

Boaler and Selling (2017) warn:

If mathematics classrooms do not engage students actively in mathematics learning, giving positive messages and opportunities to all students, they may forever be reminding students of the mismatch between