Chapter 1
No Child Too Young:
A Teacher Research Study of Socioscientific Issues Implementation at the Elementary Level

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ABSTRACT

Research on the Socioscientific Issues (SSI) framework provides compelling evidence of its ability to provide contextualized science learning as preparation for informed citizenship. However, few SSI studies provide insight as to whether the pedagogical demands of SSI warrant modification or refinement when implemented with young children. Through this exploratory teacher research study, SSI units were developed and implemented in the teacher-researcher's first, second, and fourth grade science classrooms over a one-year period. Results suggest that while SSI provided a critical real-world context for science learning and student discourse, several developmentally-influenced challenges were evident including students' difficulties in shifting from emotional to cognitive bases of argumentation, unintended activation of student fears, confusion between real and imaginary scenarios, and uneven emotion regulation. Findings and recommendations provide a foundation for future research on curricular and pedagogical supports that can facilitate successful elementary SSI implementation.

INTRODUCTION

I wait for it each day…that magical moment when my students forget that I'm there! At that instant, I envision my classroom as a rainforest and I, an intrepid explorer listening intently to its sounds. Quiet and tentative at first, they rise to a delicious cacophony of voices giggling, arguing, squealing, and buzzing, with only an occasional "Dr. Kahn!" squawking like a raucous bird piercing the discursive mist. For me, these are the happiest times in elementary science teaching; when young children are given the tools, opportunities, and encouragement to share their ideas, they can be magnificently unguarded, incredibly insightful, and at times oblivious to your presence. They have so much to say! That's only true, I think, if you earn their trust and create an environment that is safe for their deepest thoughts. The beauty of teaching science to young children is that they are only mildly indoctrinated into societal norms; elementary students say what's on their minds, providing what could be an ideal context for enacting SSI. ~Teacher/Researcher Journal Entry, 2016

The *Next Generation Science Standards* (NGSS Lead States, 2013) call for engaging students' interests in science-related issues while providing them with the content knowledge and practical skills to apply science in their everyday lives. Arguably, the Socioscientific Issues (SSI) framework addresses this goal as it utilizes the negotiation of real-world, ill-structured, socially-related scientific issues as the context for science learning while mediating argumentation (Chinn & Brewer, 1993; Lin & Mintzes; 2010), moral and character development (Zeidler, 2014), moral sensitivity (Fowler, Zeidler, & Sadler, 2009), informal reasoning (Karpudewan & Roth; 2018), Nature of Science (Abd-El-Khalick, 2006; Khishfe, Alshaya, BouJaoude, Mansour, & Alrudiyan, 2017), perspective taking (Kahn & Zeidler, 2019), and the cultural perspectives necessary for responsible global citizenship (Lee, Chang, Choi, Kim, & Zeidler, 2012). These hallmarks of SSI, which differentiate it from earlier science and technology frameworks, would seem to bolster the hypothesis that SSI should be particularly effective at the elementary level as developing the whole child, including socioemotional and ethical aspects of their character is a key goal for teachers of young children (Denham, 2015). In addition, literacy and numeracy, which form the foundation of the *Common Core State Standards* (National Governors Association Center for Best Practices, 2010) and comprise the bulk of elementary teaching time (Blank, 2013), are easily embedded within SSI curriculum as SSI is an interdisciplinary approach to science teaching that challenges students to utilize and evaluate a variety of texts and media sources and analyze data in real-world contexts (Zeidler & Kahn, 2014). This would seem to position SSI as a particularly *efficient* framework for elementary teachers who often struggle with limited time to "cover" all that needs to get done each day. While advocates do indeed describe

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