Shifts in funding for science curriculum design and their (unintended) consequences

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Abstract

Federal agencies in the Unites States invest heavily in the development of science curriculum materials, which can significantly facilitate science education reform. The current study describes the characteristics of K-12 science curriculum materials produced by federally funded projects between 2001 and 2010, and examines how these shifted over time as a result of changes in funding priorities. The portfolio review revealed a shift away from comprehensive curriculum, an overall decrease in some educative teacher supports, and an increase in reliance on technology-based materials. Moreover, findings revealed increasing support for research alongside development and for open access. Possible unintended consequences of these shifts are discussed pertaining to the depth of changes in teaching and learning, and to the scalability of materials.

Introduction

Federal policy makers in the United States have an active and enduring interest in science, technology, engineering and mathematics (STEM) education (Bybee, 2013; National Academies, 2007). Annual federal investments for STEM education are typically in the range of $2.8 to $3.4 billion (Gonzalez & Kuenzi, 2014), with a substantial portion of this spending supporting the development of curriculum materials intended to improve the quality of science teaching and learning (IES, 2008; Singer & Tuomi, 1999). These curriculum materials serve as tools that teachers can use to enact changes, and as such are important vehicles for reform (Carlson & Anderson, 2002; Remillard, Harris, & Agodini, 2014).

Landmarks in the history of science education reform in the United States, and in the ways policy makers and educators envisaged curriculum materials, came about in the 1990s with the publication of Benchmarks for Science Literacy (AAAS, 1993) and the National Science Education Standards (NRC, 1996). These documents signified a joint statement from the science and science education communities about what all students should understand and be able to do as a result of their school learning experiences (Carlson & Anderson, 2002), and laid the foundation for more recent reform movements. Moreover, they also provided a framework for focused science education funding from federal agencies (NRC, 2007) which, through their program solicitations, have had important influence on the direction of science education reform (Earle, 2011).

There are two compelling reasons to investigate how federal programs have historically shaped science curriculum development efforts. First, in an era of heightened scrutiny of federal spending, justification is needed for the expenditure of public monies on these programs (Milesi, Brown, Hawkley, Dropkin, & Schneider, 2014). Second, as funding priorities change over time

to fit into the larger policy context, an examination of the potential (unintended) consequences of these shifts is crucial to guide future funding decisions as well as research and development efforts. In this paper we attempt to chart this territory by examining how shifts in funding priorities between 2001 and 2010 are reflected in the characteristics of funded K-12 science curriculum materials.

In the following sections we first provide a brief overview of the two major federal agencies supporting the development of curriculum materials for K-12 science education in the United States, and discuss changes in their funding priorities over time. We then describe key design features distilled from the literature and used to guide our analysis of the curriculum materials developed by the funded projects.

Portions of this publication are available only upon request. Please contact the authors.

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