

Chapter 7

Change is Everywhere: Integrated STREAM Education in Kindergarten

Vanessa Morrison

Adrian College, USA

Andrea R. Milner

 <https://orcid.org/0000-0002-6644-1760>

Adrian College, USA

Natasha Wetzel

Adrian Public Schools, USA

ABSTRACT

Diversity, equity, and inclusivity in STEM education is imperative for the future progress of our country in the 21st century. This chapter presents integrated STREAM education teaching strategies and instructional activities conducted with kindergarteners in a rural, lower-socioeconomic, high minority school district in the mid-west. Young children in underserved communities such as this one often have less opportunities to engage in science practices compared to those in more affluent schools.

INTRODUCTION

A scientifically literate citizenry is essential for this nation to remain prosperous, productive, and economically competitive (Committee on Prospering in the Global Economy of the 21st Century, 2007). As we move through the innovative age of the 21st century where technological advancement continues to prevail across the

DOI: 10.4018/979-8-3373-0345-1.ch007

globe, it is paramount that the United States P-12 educational settings motivate and educate all students to deepen their understanding of essential knowledge necessary to become scientifically literate citizens with the potential to successfully enter STEM careers (Koehler et. al., 2016; Mantzicopoulos et al., 2008; Sanders, 2009).

At its inception by the National Science Foundation, STEM (Science, Technology, Engineering, and Mathematics) aimed to promote critical thinking and problem-solving skills among students to prepare them for competitive and innovative technological careers in the sciences. With a push towards hands-on, creative thinking – the art world refashioned the acronym to STEAM (Sciences, Technology, Engineering, Arts, and Mathematics) by including Art. This was seen as a more sustainable way to ensure risk taking in designing a product and viewing it through different lenses. However, with the introduction of the 21st Century Skills, this concept evolved to STREAM (Science, Technology, Reading, Engineering, Art, and Mathematics) as a way to highlight the importance of Reading in STEM. Thus, STREAM based instructional lessons not only focus on academic subjects, but include collaboration, communication, creativity, and critical thinking – the essential components that is now a large-scale global movement (Nguyen, Sivapalan, & Hiep, 2020). The infusion of reading into the initial STEM model, results in a transdisciplinary approach to learning and teaching (Debroy, 2017) and is good practice across several domains (Bryan et al., 2016; Johnson, 2018; Sun & Zhon, 2023).

The STREAM fields have more influence on a robust economy as opposed to non-STREAM fields; and the shortage of qualified workers to fill STREAM jobs in the US has slipped in rank from the top position it once held in the areas of innovation and technology (Koonce et al., 2011). Some (Sanders, 2009) refer to this concern as a “STREAM pipeline” that is, the number of students going into STREAM fields, especially those from underrepresented populations; and appealed for educators to find ways of fostering young children’s interest in STREAM education that will sustain interest for the remainder of their education. Diversity, equity, and inclusivity in STEM education encourages innovation by harnessing varying backgrounds, point of views, and experiences...[however] diverse populations are still underrepresented in STEM (STEAM Ahead, 2023).

This reality is two-fold: an accelerating increase in STREAM career fields, but not sufficient qualified workers to fill these jobs; and lack of students’ interest in STREAM domains as they enter middle school and beyond (Sanders, 2009); thus, the need to encourage students to pursue STREAM education and relevant careers by building a strong interest starting in the early childhood years (Eshach, 2011; Patrick et al., 2008; Tippett & Milford, 2017). According to the National Association for the Education of Young Children (NAEYC), early childhood refers to birth through age 8.

36 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage: www.igi-global.com/chapter/change-is-everywhere/381955

Related Content

Using Dynamic Geometry Software to Engage Students in the Standards for Mathematical Practice: The Case of Ms. Lowe

Milan Sherman, Carolyn McCaffrey James, Amy Hillenand Charity Cayton (2015). *Cases on Technology Integration in Mathematics Education* (pp. 227-256). www.irma-international.org/chapter/using-dynamic-geometry-software-to-engage-students-in-the-standards-for-mathematical-practice/119145

Getting to "Know" STEAM

Merrie Koester (2017). *Cases on STEAM Education in Practice* (pp. 53-85). www.irma-international.org/chapter/getting-to-know-steam/177508

Flying a Math Class?: Using Web-Based Simulations in Primary Teacher Training and Education

Katerina Mavrouand Maria Meletiou-Mavrotheris (2015). *STEM Education: Concepts, Methodologies, Tools, and Applications* (pp. 506-532). www.irma-international.org/chapter/flying-a-math-class/121857

Secondary Education Mathematics and UDC Expectations: Do They Align? If Not, What's Next?

Jeffery S. Flemingand Shurron Farmer (2019). *K-12 STEM Education in Urban Learning Environments* (pp. 183-207). www.irma-international.org/chapter/secondary-education-mathematics-and-udc-expectations/225607

Bee Pollination

Kerry Carley Rizzuto, John Henningand Catherine Duckett (2017). *Cases on STEAM Education in Practice* (pp. 164-182). www.irma-international.org/chapter/bee-pollination/177513