Chapter 9

Can Everyone Code?
Preparing Teachers to Teach
Computer Languages as a Literacy

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ABSTRACT

The learn-to-code movement is no longer just supported in computer science classrooms; instead, coding instruction has proliferated widely throughout the kindergarten through 12th-grade levels. Yet, educators are just beginning to understand the complexities with teaching students to code. In this research, the authors posit that coding is a language that can be taught through a literacy-based lens. In this chapter, the authors share findings from a study that examined pre-service teachers’ aptitudes, interests, and background knowledge for teaching Swift to elementary school students. In addition, the authors explain how teachers were able to transfer what they learned about coding in Swift Playgrounds to a similar task on a different platform. The chapter ends with examples of how primary-grade teachers employed aspects of literacy instruction to teach basic coding using a variety of applications and tools.

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INTRODUCTION

Unbeknownst to many, the screw - an early simple machine, is the unheralded catalyst for modern day literacy. Johannes Gutenberg, when it came time to design the printing press, naturally looked towards other screw press machines for inspiration. As printers could now affordably produce more books, thus providing more of the general population access to texts, the transmission of language and culture commenced at a furious pace throughout Europe. Currently, the field of education is experiencing another renaissance of sorts, with the proliferation of mobile devices spurring a new generation of learners to use technology, and the required coding involved, for creative problem solving. Mobility, then, lies at the heart of these new, participatory literacies in which technology users fluidly engage and navigate various media platforms as producers of content rather than mere consumers.

In the media, messages about the importance of coding as an essential literacy are abundant, where the general message is that everyone should learn to code in order to be fully literate participants in our future society (Dimeo, 2017). Annette Vee (2017) argued that coding “is a socially situated, symbolic system that enables new kinds of expressions as well as the scaling up of preexisting forms of communication” (p. 3). As such, we as a global population are in the midst of “scaling up” this communication; one only has to look at how younger generations converse with each other. Each day, technology users recognize and employ programming terms and algorithms as they refine their search parameters and script their music playlist by organizing, liking, and developing classes of information.

The intentional ways software developers (e.g., MIT’s Scratch and App Inventor) and educators are making programming—formerly an exclusively computer science laden term—more accessible to the general population are contributing to the cultural shifts in how and where programming is taught. For example, the mere utterances of “coding” signify this shift. However, in order to make coding truly accessible to the general population through contemporary and effective teaching practices, it is important for us to first consider what factors are associated with the ease with which pre-service teachers learn to code and what types of preparation pre-service teachers receive in order to provide quality coding instruction.

BACKGROUND

On September 12, 1962, then President John F. Kennedy stated while speaking to about 35,000 people at Rice University, “We set sail on this new sea because there is new knowledge to be gained and new rights to be won, and they must be won for the progress of all people” (n.p). While the propaganda associated with this speech has been debated widely, undoubtedly these words helped spawn an entire generation of engineers, scientists, mathematicians and computer scientists in the global pursuit to put humans on the moon. The impact of this agenda dynamically changed our way of life and the tendrils of this movement generated massive changes in education, pop culture, sciences, literature, economics, business and manufacturing. Creativity blossomed, science and technology boomed, and soon a whole generation of problem-solvers were able to send multiple individuals to the moon and back with computing power lower than what is contained in a modern-day smartphone.

We may be in the midst of another technological renaissance similar to the one described above; today’s movement spurred the private sector’s space race of both Elon Musk and Richard Branson’s mission to send “ordinary” people into orbit as well as the U.S. government’s desire to send humans to Mars (Obama, 2010). As such, science, technology, engineering, art, and mathematics, collectively coined