Chapter 11
An Approach to Design-Based Implementation Research to Inform Development of *EdSphere*®: A Brief History about the Evolution of One Personalized Learning Platform

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ABSTRACT

Fulfilling the promise of educational technology as one mechanism to promote college and career readiness compels educators, researchers, and technologists to pursue innovative lines of collaborative investigations. These lines of mutual inquiry benefit from adopting and adapting principles rooted in design-based implementation research (DBIR) approaches. The purposes of this chapter are to: (a) provide the research foundation on which a personalized learning platform was developed, (b) present the evolution of EdSphere, a personalized learning platform that resulted from a deep and long-term collaboration among classroom teachers, school and district administrators, educational researchers, and technologists, and (c) describe a need for development of innovative technologies that promote college and career readiness among our earliest readers.

INTRODUCTION

Around the world, it is widely accepted that a quality education is one of the primary levers to increasing the percentage of educated citizens who may successfully participate in the workforce; with untold economic and societal benefits to countries that make investments in education (Murnane & Willett, 2011, Chapter 1; Stewart, 2012, Zhao, 2012). Rapid changes in the nature of work in the 21st Century has prompted policy-makers and educators to implement a range of initiatives

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with the urgency demanded by the significant gap between our children's current trajectory towards college and career readiness (CCR) described in the Common Core State Standards (CCSS) (National Governors Association Center [NGA] for Best Practices & Council for Chief State School Officers [CCSSO], 2010; Phillips & Wong, 2012, Williamson, 2008, Williamson, Fitzgerald, & Stenner, 2013), 21st Century Skills (Partnership for 21st Century Skills, 2009), and Common European Framework of Reference (CEFR, 2001; North, 2014). Many, if not all, current educational initiatives incorporate innovations necessary to ameliorate persistent challenges posed by an achievement gap between expectations and current readiness demanded in post-secondary institutions and the workplace.

Technology-based innovations are increasingly being promoted in federal and state reports and educational organizations (for- and not-for-profit) as key components to most, if not all, efforts to enhance student college and career readiness (Aldunate & Nussbaum, 2013; Kim, Kim, Lee, Spector, & DeMeester, 2013; U.S. Department of Education, 2010, 2013). In part, proponents of technology-based solutions, with 24-7-365 access, posit benefits such as: (a) lengthening the school day, (b) extending the school year, and (c) providing greater personalization of academic learning time (Calkins & Vogt, 2013; Childress, 2013; U.S. Department of Education, 2010, 2012, 2013; U.S. Programs, Bill and Melinda Gates Foundation, 2012).

It is however, possible that increasingly sophisticated technologies will disrupt widely accepted notions about where, when, and for how long a student learns along the path towards college and career readiness. Additionally, innovations that disrupt the status quo, with no commensurate increase in student readiness for college and career, will serve only to decrease investment, increase frustration, and ultimately abandonment of technologies. Growing pains are already being felt due to insufficient resources being devoted to restructuring use of time during the school day, enhancing wireless bandwidth, improving security, maintaining hardware, professional development, and on-going technical assistance. Implementing disruptive technologies requires providing time for teachers to plan its use and refining of original implementation plans using qualitative and quantitative data to inform decisions. The benefits and frustrations related to daily use of technology-at-scale are being felt at a time when educators are spending considerable amounts of professional development and classroom instructional time implementing other non-technology based strategies purported to support student progress towards college and career readiness.

Until recently, research investigating the impact of technology on enhancing teacher effectiveness and student growth towards CCR has provided equivocal evidence of effectiveness. Such results are attributable, in part, to the speed at which software is developed then deployed in classrooms. However, the emphasis and requirement for rapid improvement in test scores and an organization's need for a return on investment has contributed to a lack of long-term collaborations among key stakeholders. This lack of collaboration impedes testing the efficacy of technologies and models of professional development that promote teacher effectiveness and student growth. Currently, the adoption of educational technologies is all-to-similar to the process that has governed textbook adoptions for decades. The expense in time and currency is too great and the risks too grave for this antiquated textbook adoption model to govern the adoption of next generation learning resources.

A growing body of evidence points to design principles and approaches that ensure technology integrates the active ingredients that promote CCR among students (Dai, 2012; Hanlon, 2013, Hanlon, Greene, Swartz, & Stenner, 2015;