Mobile Learning:
Technology as Mediator of Personal and School Experiences

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ABSTRACT

This study reports on the effects of a mobile game designed in conjunction with an art museum to develop children’s understanding of line, shape, and color. Four researchers (two graduate students and two professors at a private university in the mid-Atlantic region of the United States) examined 8 children, ages 6 to 13, for conceptual change in their understanding of art. Grounded theory and thematic analysis were used to examine children’s conceptions of line, shape, and color through gameplay and to answer the research question, “How does a mobile application impact students’ conceptual understanding of line, shape and color?” The researchers found that the mobile learning experience was effectively mediating participants’ school and personal experiences to support conceptual change.

KEYWORDS

Computer Uses in Education, Games, Mobile Applications, Mobile Learning, Nonformal Learning

INTRODUCTION

The proliferation of mobile devices and unique characteristics of mobile applications have led to a significant growth in mobile learning. Mobile applications offer the opportunity for just-in-time and location-based learning in nontraditional settings, although it is still important for these applications to be developed with specific learning goals in mind. The learning affordances must be evaluated with a variety of learners in multiple settings in order to create ubiquitous and seamless applications that provide learning opportunities across multiple contexts. We designed a mobile 3D iOS game called Keys to the Collection to promote engagement in non-formal learning that focuses on concepts in art. This study describes the results of an empirical investigation about the ways in which a mobile application can impact children’s conceptual understanding of art,

BACKGROUND LITERATURE

Technology and Mobile Learning

As Mishra et al. (2011) allude to, technological advances have provided unique opportunities and challenges for educators. Siemens and Tittenberger (2009) argued that technology allows individuals to control their learning. As such, it is a tool that can be used to create richer learning experiences in
a variety of ways (for example, to access remote resources or exercise creativity). While technology is a tool without an inherent bias, the ways in which it is used must be examined and refined in order to accomplish desired learning goals (Siemens & Tittenberger, 2009).

Mobile applications are one specific example of technology that can be used for learning. These applications provide the opportunity for learners to access information across space and time, making the learning experience truly seamless and ubiquitous (Ozdamli & Cavus, 2011). Studies have demonstrated mobile learning’s potential for creating positive changes in student attitude and achievement (Martin & Ertzberger, 2013). At the same time, researchers caution that mobile applications are not the elusive educational “magic bullet” and factors such as design and content must be considered in order to fully leverage these tools (Falloon, 2013).

In a review study, researchers identified four essential attributes of mobile learning: mobile learner and mobile coach (real or virtual), technologically enhanced learning process, situated learning environment, and virtual group awareness/strategies (Jeng, Wu, Huang, & Yang, 2010). Kearney, Schuck, Burden, and Aubusson (2012) created a pedagogical framework for mobile learning based on the intersection of authenticity (contextualized environments), customization (personalized and autonomous learning), and social interactivity (connected learning), all within the consideration of a time-space continuum that is more flexible and seamless than traditional teaching/learning approaches.

In regards to art, one study evaluated 16 iOS mobile applications designed for learning about art (Katz-Buonincontro & Foster, 2013). The applications were scored across six categories: psychological learning principles, pedagogical voice, physiological features, social-cultural dimensions, aesthetic understanding, and creative self-efficacy. The applications did not rate highly on any of the dimensions, but were particularly lacking in creative self-efficacy.

Overall, the literature on mobile learning points to it as an advantage over more traditional learning approaches, particularly in settings where there is not an official teacher or when the learning experience needs to be individualized to accommodate the location, interest, or time available to the learner. At the same time, many mobile applications, and particularly those designed for learning about art, are lacking key components that would allow for engaging and seamless learning experiences. In this study, we sought to make sense of how a game created for mobile technologies can support learners in developing more refined understandings of line, shape and color.

21st Century Skills

In addition to domain-specific knowledge, most experts now recognize the need for understanding that extends beyond any specific academic disciplinary area (Jenkins, 2009). These 21st century skills have been divided into three main categories: cognitive skills, such as critical thinking and problem solving; intrapersonal skills, such as self-regulation and emotional monitoring; and interpersonal skills, such as communicating with others and teamwork (Pellegrino & Hilton, 2012). In a review of ten reports/books on 21st century skills, Mishra and Kereluik (2011) identified three main kinds of knowledge that are highlighted as essential: foundational knowledge (what should people know?), meta knowledge (how do people work with foundational knowledge?), and humanistic knowledge (who is the learner and how do they interact in a broader social context?). Likewise, Mishra, Koehler, and Henriksen (2011) used the Technological-Pedagogical-Content Knowledge (TPACK) framework to describe how 21st century skills could be enhanced by technology in seven key cognitive areas: perceiving, patterning, abstracting, embodied thinking, modeling, transformational play, and synthesizing.

There is a growing body of research into how digital games can be used to teach or enhance these 21st century skills (Galarneau & Zibit, 2011; Jenkins, 2009; Schrier, 2006). Mobile games in particular contain features (ubiquitous access, interaction with others across space and time, just-in-
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