Game-Based Learning and Information Literacy:
A Randomized Controlled Trial to Determine the Efficacy of Two Information Literacy Learning Experiences

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ABSTRACT

In the 21st century, students have access to a plethora of information. As such, the skills required to access and effectively sort through this information (information literacy skills) become ever more important for success in both academic and non-academic settings. This study sought to assess the efficacy of two educational games designed to increase high school students’ information literacy skills. Using a randomized controlled trial in a high school setting, the games were integrated into a standard curriculum and tested for efficacy. Post-test results indicated that both games effectively transmit targeted skills. Additionally, improved performance (relative to controls) on end-of-instruction testing (EOI; end-of-year state testing) suggest that these skills transfer across important academic domains. The study provides strong evidence to support the use of these two educational games to supplement and enhance information literacy instruction.

KEYWORDS

Digital Game-Based Learning, Educational Games, EoI Instruction, Information Literacy

INTRODUCTION

Supporting one of the goals of the U.S. Department of Education’s Gaining Early Awareness and Readiness for Undergraduate Education (GEAR UP) project, the University of Oklahoma sought to develop a game-based learning (GBL) experience that would help prepare students for post-secondary education. After careful review of past student performance on state-level assessments, the literature on students’ academic readiness, and conversations with English and language arts specialists, the topic of information literacy was selected as a high-need skill. The purpose of this study was to demonstrate the efficacy of the educational games The Detective: Bavaria (Bavaria; University of Oklahoma, 2015a) and The Detective: Verona (Verona; University of Oklahoma, 2015b) in the instruction of a variety of information literacy skills.

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INFoRMATIoN LITERACy

The term information literacy (IL) is used to describe the skills needed to utilize a wide range of information tools to create solutions to problems (Zurkowski, 1974). Though first applied to librarianship (Zurkowski, 1974), IL skills are now recognized as necessary tools required to navigate today’s information age (Fabbi, 2015; Obama, 2009; U.S. National Commission on Library and Information Science, 2003). In 1989, the Presidential Committee on Information Literacy defined IL as the expertise required for an individual to recognize, locate, evaluate, and use information (American Library Association). The American Association of School Librarians (AASL) reiterated the complexity and underlined the importance of IL skills in its Standards for the 21st-Century Learner (Johns, 2008). Recognition of the importance of IL skills continues to increase. As such, renewed efforts to incorporate IL into secondary education abound, and considerable resources have been allocated to concretely define the construct (Rader, 2002).

The evolving definition of IL has been influenced by its relationship to other competencies including computer literacy, library literacy, media literacy, network literacy, and visual literacy (Breivik, 2005). These literacies share a unique requirement: to be considered literate in a particular field one must be able to access, manage, integrate, evaluate, and create information (International ICT Literacy Panel, 2007). For the purposes of this research, we define IL as the ability to: (1) identify problems that stem from a lack of information; (2) efficiently access, gather, and manage necessary information from a variety of credible sources; (3) consider multiple interpretations and uses and synthesize information to construct new knowledge; (4) utilize newly constructed knowledge to identify solutions; and (5) communicate the information in a manner appropriate to the audience being addressed (Addison & Meyers, 2013; Bruce, Hughes, & Somerville, 2012; Crane et al., 2003; Vanderpol, Brown, & Iannuzzi, 2008). This definition, as well as National and State Standards, were closely observed during development of both the Verona and Bavaria games (University of Oklahoma, 2015b, 2015a). Both games were designed to increase students’ ability to identify and utilize appropriate pieces of information through a specific subset of skills.

The Need for Information Literacy Instructional Tools

IL skills have been identified as an important component required for success in higher education (Fabbi, 2015). President Obama (2009) proclaimed that IL’s level of importance is on par with hallmark educational skills such as reading, writing, and arithmetic. Unfortunately, a large number of high school students continue to graduate without the research and critical thinking skills necessary to succeed at the college level (Foster, 2006; Gross & Latham, 2007; Head & Eisenberg, 2010, 2011; O’Sullivan & Dallas, 2010; Thonnyc & Montgomery, 2014). Head and Eisenberg (2011) report that only approximately 13% of graduating high school seniors and first-year college students are considered information literate. Although many high school students have the basic skills required to retrieve information, particularly when searching the Internet, they are often missing the critical evaluations necessary to succeed at the college level (Head & Eisenberg, 2011; Jackson & Hansen, 2006; Swoger, 2011). In developing both the Verona and Bavaria games, the University of Oklahoma (2015b, 2015a) sought to provide instructional tools designed to decrease the disparity between the identified need for IL skills and the reality of students’ skills upon transitioning into higher education.

Game-Based Learning

Over the last several decades, researchers have provided mounting evidence of the efficacy and appeal of educational games. Research shows that GBL appears to increase student understanding across a variety of domains, such as engagement, drive, collaboration, and writing (Groff, Howells, & Cranmer, 2010); and the GBL characteristics of interactive problem-solving, specific goals, adaptive challenges, well-timed feedback, learner agency, and uncertain outcomes help foster student learning (Shute & Ke, 2012). Furthermore, GBL environments incorporate design elements (goal orientation, task
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