Online Learning at the K-12 Level: 
An Examination of Teacher Technology Use by Subject Area and Grade Level

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ABSTRACT

Technology integration has had a profound effect on K-12 education with research yielding positive results in student learning. Most research to date has been conducted in face-to-face settings. With the growth of online K-12 learning, an opportunity exists to examine technology use in the “new” K-12 classroom. The aim of this research was to investigate the potential relationships between specific technology and subject area and grade level and why online K-12 teachers use technology in their online classrooms. Results suggest that in an online K-12 learning environment, relationships may exist between what technology is used and the subject area and/or grade level it is used in.

KEYWORDS
Grade Level, K-12, Online Learning, Subject Area, Technology Integration

INTRODUCTION

In the field of education, the use of technology in the face-to-face (f2f) classroom has become accepted practice and teachers will use technology to enhance and support teaching and learning (Cheung & Slavin, 2013; Lai, 2014; Liao, 2007; Tekbiyik & Akdeniz, 2010). As education has evolved to use more technology, it has transformed the classroom and has taken learning online. Where once more prevalent in higher education, online education has made its way into the K-12 realm. By late 2009, 27 states in the U.S. had approximately 320,000 students enrolled in state-wide K-12 virtual schools taking at least one semester long course (Watson, Gemin, Ryan, & Wicks, 2009). Two years later, before 2011 came to an end, online and/or blended learning options were offered to students in all 50 states (Watson, Murin, Vashaw, Gemin, & Rapp, 2011).

Although instruction is mediated through technology in an online classroom, it stands to reason that additional technology could be used to support and/or enhance instruction as well. The use of technology in online classrooms has begun to move beyond the learning management system (LMS) and research investigating technology integration has started, but much of it seems to be in higher
education (Armstrong, 2011; Augar, Raitman, & Zhou, 2004; Donne, 2012; Monaghan & Santiago, 2001; Munoz & Towner, 2009; Wheeler & Wheeler, 2009; Williams & Jacobs, 2004). There appears to be less research examining technology integration (i.e. technology beyond the LMS) in the K-12 online classroom.

The purpose of this research is to investigate how technology is used in online K-12 classrooms, specifically the potential relationships between technology and subject area and grade level and the reasons why online K-12 teachers use the technology. Although this research does not address the impact of technology on teaching and learning in the online K-12 classroom, it does provide results that can help us better understand the use of technology in this learning environment.

Defining “Technology”

The term “technology” is often used in a simplified sense and research examining the use of technology by teachers rarely provides a clear definition for “technology” or “technology integration” (Bebell, Russell, & O’Dwyer, 2004). Hew and Brush (2007) note that although there is not a standard definition, there are common elements that researchers use when discussing technology integration in the K-12 setting. These elements typically center on using computing devices for instruction. In the context of this study, technology was viewed as technology-based tools or applications that teachers use in the online classroom beyond the LMS. The researcher acknowledges that technology can vary greatly in form and function, but with this research being exploratory in nature, using a broader definition of “technology” was seen as appropriate.

Research Questions

The following served as the research questions:

1. What technology tools are used by online K-12 teachers across subject areas?
2. What technology tools are used by online K-12 teachers across grade levels?
3. What relationships, if any, exist between subject area and technology tools in online K-12 classrooms?
4. What relationships, if any, exist between grade level and technology tools in online K-12 classrooms?
5. Why do online K-12 teachers use technology in their online classrooms?

LITERATURE REVIEW

As previously mentioned, much of the research on K-12 classroom technology integration has occurred in f2f settings (Cheung & Slavin, 2013; Lai, 2014; Liao, 2007; Maninger, 2006; Popejoy, 2003; Serİn, 2011; Tekbiyik & Akdeniz, 2010; Türel & Johnson, 2012). Maninger (2006) examined the integration of technology into a ninth grade English class and its ability to assist students in preparing for state-mandated testing while Popejoy (2003) observed the practices in human-technology interaction that emerged while investigating technology use in the science classroom. Kulik (2003) found technology use leading to increases in academic achievement in math and science, as well as an increase in reading scores and writing skills. In a study conducted by Russell and Platí (2002) in the eighth grade classroom, it was concluded that students’ writing ability was underestimated by traditional methods as compared to using portable electronic writing devices. Chou, Block, and Jesness (2012) examined the use of iPads in four ninth grade geography classrooms where several benefits emerged, while Green, Inan, and Maushak (2014) discovered that student-generated vidcasts supported the linguistic development of middle school level ESL students. In a nine week study examining the use of handheld computer in a fifth grade classroom, Alexiou-Ray and Wright (2012) found that students reacted favorably to using the technology.
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