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Review

Use of Web 2.0 technologies in K-12 and higher education: The search for evidence-based practice

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ABSTRACT

Evidence-based practice in education entails making pedagogical decisions that are informed by relevant empirical research evidence. The main purpose of this paper is to discuss evidence-based pedagogical approaches related to the use of Web 2.0 technologies in both K-12 and higher education settings. The use of such evidence-based practice would be useful to educators interested in fostering student learning through Web 2.0 tools. A comprehensive literature search across the Academic Search Premier, Education Research Complete, ERIC, and PsycINFO databases was conducted. Empirical studies were included for review if they specifically examined the impact of Web 2.0 technologies on student learning. Articles that merely described anecdotal studies such as student perception or feeling toward learning using Web 2.0, or studies that relied on student self-report data such as student questionnaire survey and interview were excluded. Overall, the results of our review suggested that actual evidence regarding the impact of Web 2.0 technologies on student learning is as yet fairly weak. Nevertheless, the use of Web 2.0 technologies appears to have a general positive impact on student learning. None of the studies reported a detrimental or inferior effect on learning. The positive effects are not necessarily attributed to the technologies *per se* but to how the technologies are used, and how one conceptualizes learning. It may be tentatively concluded that a dialogic, constructionist, or co-constructive pedagogy supported by activities such as Socratic questioning, peer review and self-reflection appeared to increase student achievement in blog-, wiki-, and 3-D immersive virtual world environments, while a transmissive pedagogy supported by review activities appeared to enhance student learning using podcast.

Contents

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1. Introduction

Throughout history, educators have always been interested by the question of how technology can be used to transform education and enhance student learning (Hew & Brush, 2007). One of the most recent technologies that have captured the attention of many educators around the world is Web 2.0, a term coined by O'Reilly in 2004 to explain the concept of grouping a set of design and functional characteristics for web pages (O'Reilly, 2005).

Web 2.0, which is also known as the read-write web (Gillmor, 2004), allows two-way communication between the site and users. In its most basic form, Web 2.0 refers to a concept which allows individuals to collaborate with one another and contribute to the authorship of content, customize web sites for their use, and instantaneously publish their thoughts (Alexander, 2006; Heafner & Friedman, 2008). With Web 2.0, individuals can now contribute to the Internet with little technical know-how (e.g., using a Web editor or writing HTML code). Individuals can now become contributors to web sites instead of being mere readers reading the contributions made by others (Heafner & Friedman, 2008). As a result, the content of Web 2.0 sites is constantly changing because content can be updated by multiple authors. It is therefore not surprising that Web 2.0 technologies are hugely popular around the world (Churchill, 2011).

Many claims and suggestions have been made about the educational potential or benefits of these technologies. However, it is important to note that such claims or suggestions are often made *not* based on research evidence, but on mere conjectures. Consequently, such claims or suggestions may not be reliable information or advice for educators to follow. There is therefore an important need to search for evidence-based practice concerning how the use of Web 2.0 technologies might improve student learning.

Following the field of medical science, evidence-based practice in education involves making pedagogical decisions that are informed by relevant empirical research evidence. The main objective of this paper is to review the current literature on the use of Web 2.0 technologies in K-12 school (i.e., both primary and secondary schools) as well as higher education settings (e.g., colleges and universities) in order to discuss possible evidence-based practice (if any) that could provide educators and researchers with informed direction for using the technologies to achieve specific learning goals.

The rest of the paper is organized as follows. We first propose a possible framework to classify the various Web 2.0 technologies. This is followed by a brief description of some Web 2.0 technologies. We then describe our data sources and method of analyses and the resulting findings. In the discussion we focus on several directions for future research related to the use of Web 2.0 technologies in education settings.

2. A framework to classify Web 2.0 technologies

There is currently a large range of Web 2.0 technologies available for educators to use with their students. Adapting the works of Churchill (2011) and Bower, Hedberg, and Kuswara (2010), we propose one possible framework of making sense of this ever-expanding number of technologies – which is to classify them according to their main functionality, and the primary degree of synchronicity they enable (e.g., asynchronous, synchronous). Synchronous tools allow instant access to feedback and comment, while asynchronous technologies provide students more time for reflective thinking (Bower et al., 2010). A summary of some Web 2.0 technologies is presented in Table 1.

According to Table 1, Web 2.0 technologies may be classified based on what they are typically used for (i.e., their main functionality): online reflection, social spaces, online collaboration, social bookmarking, and repository. This list of functionality should not be seen as definitive and exhaustive but merely a way to group the current purposes of the major Web 2.0 technologies.

2.1. Brief description of Web 2.0 technologies

An example of a Web 2.0 tool for online reflection is the weblog or blog (in short). With blogging tools such as Blogger (http://www.blogger.com) and Edublogs (http://edublogs.org), students can easily publish their experiences thoughts online