Apps as Assistive Technology

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INTRODUCTION

Teachers and students are increasingly using mobile devices in and out of school for education and entertainment (Molnar, 2015; Nagel, 2014; Rodríguez, Strnadová, & Cumming, 2014). And along with the use of mobile technologies comes apps. Apps can support instruction for all students as well as specifically students with disabilities (Rodríguez et al., 2014; Stephenson & Limbrick, 2013). Apps can serve as assistive technology to support students with disabilities in a variety of ways, including in such areas as academics, organization, access, daily living, and communication (Bouck, 2016). The objectives of this article include:

1. Examining how apps can serve as assistive technology for students with disabilities,
2. Discussing the importance of educators not being arbitrary in their decision to select and implement apps to serve as assistive technology, such as relying on reviews, ratings, app lists, app databases, or the inclusion on a categorization on iTunes or Google Play; and
3. Presenting options for educators evaluating apps, which can assist educators in making more informed decisions for apps as assistive technology.

BACKGROUND

Mobile applications, or "apps" as they are more commonly known, are software programs specifically designed to operate on mobile devices such as tablets and smartphones; apps extend the basic capabilities of a device (Purcell, Entner, & Henderson, 2010). Apps are available pre-installed on a mobile device or are available to download through the Apple iTunes App store, Amazon Appstore, Google Play (formerly, Android Market), and Windows Store. Apps, like more traditional computer software, serve a variety of purposes for productivity (e.g., email, word processing), lifestyle (e.g., travel, fitness), gaming, entertainment (e.g., photos), social networking, education (e.g., basic math facts), and general educational topics (e.g., reference apps).

As apps and mobile devices continue to be a mainstay of daily lives, they are increasingly integrated into education. The majority of K-12 students has access to a some type of mobile device at home and/or school (Grunwald Associates LLC, 2013; Nagel, 2014). The commonly heard phrase, "there's an app for that," references that an app exists for any purpose imaginable in education – let alone individual's daily lives – from learning to write the letter A to experimenting with chemical reactions. Of all of the available apps in iTunes, an estimated 80,000 are targeted specifically to K-12 education (Apple, 2015).

While the exact number of schools with specific 1:1 mobile device program or consistent access to mobile devices is unknown, it is estimated that almost half of all K-12 students have 1:1 computing or access to a device for regular use. In 2012, this number was only 23% (Molnar, 2015). While research is limited on the benefits of apps on mobile devices in education due to the newness and ever-changing nature of technology, apps can provide benefits for all students (Cayton-Hodges, Feng, & Pan, 2015; Mehdipour & Zerehkafi, 2013).

Beyond their use by teachers and for students in general, apps can serve as assistive technology. The term assistive technology refers to both assistive technology devices as well as assistive technology services; for the purposes of this article we will be considering assistive technology as assistive technology devices. An assistive device, as first defined in the Technology-Related Assistance for Individuals with Disabilities Act of 1988 (referred to as the Tech-Act; Public Law [PL] 100-40) is, "…any item, piece of equipment, or product system, whether acquired commercially, modified, or customized, that is used to increase, maintain, or improve functional capabilities of individuals with disabilities (29 U.S.C. Sec 2202(2))." In other words, an assistive technology device is *anything* that supports students with disability. Examples of assistive technology devices include hearing aids, braille, text-to-speech, augmentative and alternative communication devices, wheelchairs, and switches.

Given the ambiguous and seemingly all-encompassing definition of an assistive technology device, assistive technologies are often categorized by level of technology as well as purpose. While a few different purpose categorization schemes exist, a common system is the one proposed by the Wisconsin Assistive Technology Initiative (WATI), which includes 13 categories: seating, positioning, and mobility; communication; computer access; motor aspects of writing and composition of written material; reading; mathematics; organization; recreation and leisure; activities of daily living; vision; hearing; and multiple challenges (Gierach, 2009).

In terms of level, assistive technology is frequently referred to as low-tech, mid-tech, and high-tech, although some also refer to a no-tech assistive technology (Blackhurst, 1997; Edyburn, 2005; Johnson, Beard, & Carpenter, 2007; Vanderheiden, 1984). No-tech assistive technology refers to an assistive technology that does not require a tool or device, such as a mnemonic (e.g., PEMDAS for remembering order of operations in mathematics – Please Excuse My Dear Aunt Sally for Parenthesis, Exponent, Multiplication, Division, Addition, Subtraction; Behrmann & Jerome, 2002; Blackhurst, 1997). Low-tech assistive technology devices are usually considered those that do not need a power source, such as a pencil grip or raised line paper. Low-tech assistive technologies are often associated with tools that require less training and cost less (Behrmann & Schaff, 2001; Blackhurst, 1997). Mid-tech assistive technology devices are those that typically operated via a battery power source (e.g., a calculator), cost more than low-tech devices but less than high-tech devices, and require more training. High-tech assistive technology devices are typically associated with computer or computer-like devices and are considered the most sophisticated technology options. High-tech assistive technologies usually cost the most as well as require the most training (e.g., speech-to-text) (Blackhurst, 1997; Edyburn, 2005; Johnson et al., 2007; Vanderheiden, 1984). Apps are considered high-tech assistive technologies.

APPS AS ASSISTIVE TECHNOLOGY

As alluded to in the prior section, apps can serve as assistive technology for students with disabilities. Apps fit the very definition of assistive technology – anything that can increase, maintain, or improve different capabilities (e.g., academics, communication, daily living) for indi-

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