



Use of Mobile Technology in the Classroom

Mobile Technology in the Classroom

Although there has been a push to use technology in the classroom since the 1980s, rapid advancements in mobile devices, including smart phones and tablets, have provided individual students the opportunity to use devices in much higher numbers in the last decade. Numerous schools have rolled out one-to-one computing initiatives as early as fourth grade requiring educators and researchers to find effective and efficient uses of mobile technology for teaching and learning purposes. A recent survey reported that 17% to 50% of school-aged children in kindergarten through 12th grade owned smartphones with Internet access and 17% to 26% of children owned a tablet computer (Project Tomorrow, 2012). Students who do not have access to a device at home will need training on how to handle a device, but all students will need initial training on how to use the device for learning purposes.

Benefits

In addition to motivating and engaging students in the learning experience, mobile technology offers the benefit of “portability” so that students can access content and communicate with instructors and classmates from any location. Mobile devices also enable authentic learning experiences such as using interactive maps to find locations or recording content for further viewing; these experiences can be especially important for students with diverse learning needs. A mobile device can be considered as assistive technology (AT) for some students with disabilities. For example, research supports the use of an iPad as a speech generating or communication device for students with autism (Lorah, Parnell, Whitby, and Hantula, 2015). Due to its ubiquitous use among middle- and high-students, students with disabilities are more likely to use a mobile device and feel less stigmatized than if they were carrying an AT device. Mobile technology has the ability to increase active student responding (ASR), wherein a student not only has to respond but respond accurately

before moving to the next trial. To illustrate this point further, when a student engages with an app to practice multiplication facts, the app can be set up such that the student has to get the answer correct before moving on to the next problem. The student receives immediate feedback on the accuracy of responses. Typical paper and pencil math worksheets do not have this feature, therefore allowing the student to practice errors until the worksheet is graded. In the latter case, the feedback is delayed. Furthermore, with the software on these devices individualizing and differentiating instruction is possible with little effort on the part of the teacher to program the devices to suit individual students’ needs. Teachers can screen students on their present levels of performance and program the apps such that students are able to practice and master unknown items.

Barriers

Despite the potential of mobile devices, there are barriers to technology-use in schools that warrant discussion. The limited technology integration in teacher preparation programs and lack of proper technical support and in-service professional development are commonly cited barriers to successful integration of technology. Teacher attitudes play a significant role in technology use in the classroom and are often a barrier to student use as well. Adapting the renowned Technology Acceptance Model (TAM) for use in education, multiple researchers have found that teacher attitude is greatly influenced by perceived usefulness and perceived ease of use (Park, Nam, & Cha, 2012; Teo, 2010; Teo, Ursavas, & Bahcekapili, 2010). However, it is important to note that these attitudes are based on perceptions. Unfortunately, research on the use of mobile technology is in its infancy and there is limited evidence of the effectiveness of technology-based instructional practice. This is partly due to the fact that teachers and schools are often resistant to

trying new practices. School policy also plays an important part in allowing students to use mobile devices as many administrators and teachers create policies that inhibit the use of devices- even if those devices are being used for educational purposes. For example, students in the Project Tomorrow (2012) survey reported that school policy preventing them from using their own devices was an obstacle to technology use.

Types of mobile devices (platforms)

The proliferation of devices has also made it difficult for teachers to understand the multitude of programs and applications available. While the iPhone and iPad received the most attention as they were first to the market, the iPhone accounts for less than 20% of smartphones in the world (Statistica, 2016). Samsung, Sony, LG, and many others have popular models that students use in schools daily. Unless the apps are created to work across multiple platforms, teachers are limited to selecting apps that are compatible with devices that are provided to them in their classroom. For example, one of the affordances of using apps on an iPad is the touch screen feature. The student is able to interact directly with the app and manipulate content on the screen. A group of students who were given the iPad to practice their math facts, but also had access to Chrome Books in their classroom, were quick in pointing out the touch screen feature was a major difference between the two devices. The students unanimously said that in the Chrome Book they had to type out the answer that took longer than responding on the touch screen on an iPad. Some applications that are available on one device (e.g. a Samsung device) may not be available on an iPad. In most cases, there are similar applications available but these are issues that need to be considered when deciding when and how to use devices in the classroom.

Accessibility features on devices

One of the major advantages that mobile phones offer students with learning disabilities are the accessibility features built-in to the device. Under the settings menu on most smart phones, teachers and student will find a broad list of accessibility features including, but not limited to, text to speech reading, enlarged text, hearing aids, guided access, and assistive touch. Text to speech can be used to help a student with dyslexia understand readings in literature class. Enlarged text is helpful for students with visual disabilities or for young students learning to differentiate between letters and numbers. Guided access can be used to help students with attention deficits stay on the correct screen and focus on one app. Assistive touch can be helpful for students with physical

disabilities navigate the screen more easily. Many of these features considered expensive just a few years ago are now native to most devices. In addition, built-in apps like the calendar, maps, voice memo, and note taker can be very valuable for all students as they learn executive functioning skills. Working memory, inhibitory control, maintaining attention, choice-making, and organizational skills are a few of the executive functioning processes necessary for cognitive control and for school success. Utilizing the features on a mobile device can help students to practice these processes on a device they carry with them daily.

Classroom management

One of the issues for teachers when allowing students to use technology is managing the classroom. All of the accessibility features above dictate that students are allowed to use their devices both in class and outside of class. Some of the features may require students to wear headphones so they do not distract other students with read-aloud options or voice memo reminders. While there are a multitude of strategies for classroom management when using devices, many teachers are concerned that students will take advantage or they do not want to seem unfair by allowing a student with a disability to use their device while others are not permitted. Unfortunately, these policies often take away a powerful tool that would allow students with disabilities to access content. It is important for teachers to practice classroom management techniques and make expectations on device-use clear and explicit. Teachers can incorporate appropriate device-use as part of their classroom rules and routines that are embedded within an overarching positive behavioral intervention and supports (PBIS) model. In such a model, students are encouraged and reinforced for following the rules and engaging in prosocial behavior. When a student does misuse the device by looking up inappropriate content or playing games instead of doing research, it is important that teachers have consequences in place for those students. However, it is equally important that not all students are punished for the misbehavior of a few.

Use of mobile technology for academic and behavioral interventions

When integrated meaningfully with curriculum and instruction, mobile technology can be beneficial in the classroom. Recent research shows promise in using mobile technology for academic and behavioral interventions. The challenge for teachers is to understand and identify ways in which they can integrate technology into evidence-based practices in their classroom. Mobile technology has

shown to be effective across numerous studies as a supplemental tool in increasing sight word reading, spelling and vocabulary knowledge, math fact fluency of students with and without disabilities. There is growing body of literature in which mobile devices are being used for behavioral interventions such as video-modeling interventions to teach social skills.

Teacher Training

Teacher training is critical to integrating the use of technology in the classroom successfully. While schools have invested in technology, teachers appear to remain reluctant to use that technology because it alters traditional classroom practices. This area of concern seems to stem from the level of teacher training – in a Digidu survey of over 600 teachers, 46% of teachers reported they lacked the necessary training to integrate technology (as cited in Johnson, Adams Becker, Estrada, & Freeman, 2015). Unfortunately, the investment in hardware has not been met with an equal investment in teacher training.

Teacher training should include access to and training on web safety, proper searching techniques, classroom management tips and tricks, and practical ideas for content introduction, skill integration, and self-regulation. Google, YouTube, Microsoft and others offer free online curriculum for teaching many of these skills to students and there are multiple resources with practical tips for integrating technology in the classroom. However, teachers are not often aware of these resources or how to use them. Most of the professional development they have been exposed to has simply been a list of tools or resources. Instead professional development should focus on pedagogy with the assistance of technology.

Researchers have shown that the most effective current professional development is teacher-led, takes place over time, and is done in face-to-face settings. It is important that schools and teachers consider how to best utilize their digital literacy personnel as co-teachers and trainers rather than simply using them to repair equipment or write policy. Instead, they should provide individual and small group training to emphasize pedagogy, help brainstorm creative ideas for the classroom, and select devices, resources, and apps that help students achieve in the classroom.

Things to consider in selecting apps (rubric)

There are a multitude of rubrics available on-line to use when evaluating apps (e.g.:

<http://www.ipads4teaching.net/critical-eval-of->

[apps.html](#)). A search on-line under “evaluating apps rubric” will yield many examples. Some of the things to consider when evaluating an app include:

- Is the app visually appealing?
- Is the app cluttered with content or easy to see and navigate?
- Is the app appropriate for the developmental level of the student?
- What do the reviews say?
- When was it last updated?
- How many students can use the app at once without it crashing?
- Does it allow for differentiation? For example, is there a speech-to-text feature built-in?
- Does it provide feedback or just content?

It is important to remember that the best evaluators of apps are the students. It is important to test the app out with children to see what they think. Regardless of how good an app is instructionally, if students do not like it, they will not use it. It is important that educators do some initial evaluation but always keeping in mind that students are the best evaluators.

Steps to integrating mobile technology

Identify target skill. Teachers can use existing screening assessment data to identify the specific target skill (e.g., fluency with text) or precursor skill (e.g., sight word reading) as the focus of the technology-based learning session. The assessment scores will serve as baseline data on students’ current levels of performance with the target skill.

Identify a progress-monitoring tool. *Intervention Central*, *Aimsweb*®, and *DIBELS* offer a wealth of resources for curriculum-based measurement for academic skills. For behavioral skills, teachers can use rating scales and skill-checklists to determine students’ progress on the target skill. The teacher should determine the frequency of monitoring students’ progress and this should be dependent on time available for testing purpose. Commonly cited frequency for progress monitoring range anywhere from assessing students after every intervention session to once a week during the intervention period.

Develop protocol for practice. When designed properly, CAI can take the form of self-mediated instruction where a student follows a series of steps during the practice/review session. To ensure smooth completion, teachers should develop a protocol of steps that clearly specify expectations and procedures. The protocol can

include rules for use of device, followed by step-by-step instructions on skill practice and program completion. Teachers should consider the format for technology use; for example, will students engage in the learning session in a small group format, pair-up, or work independently? Another consideration is the time allocated for the learning session and how many cycles or repetitions should be included. Teachers will have to trial test how long each cycle of practice takes and set the criterion accordingly. This will differ from one student to another based on their skill level with task. See Figure 1 for an example of a protocol developed for a group of first-grade students learning sight word vocabulary using a Sight Words App (Teacher Created Materials, 2015). In a recent study, Musti-Rao, Lo, and Plati (2014) reported an iPad intervention using the Sight Words App was effective in increasing the sight word fluency of six first-grade students considered at-risk in the area of reading.



Provide students training. Teachers should set aside one or two class sessions to teach students how to use the device. It is important to provide students with a rationale for why they are using the mobile device, and help generalize use of device across various environments. The training should also include how to handle devices (e.g., turning on the device, accessing the app, checking battery life and charging the device, and turning off the device). Teachers should use the protocol developed in the previous step to serve as a guide to train students through each step of the intervention. Students training should

take the form of “model-lead-test” in which the teacher first models the step, then guides students to complete the step with teacher’s help (guided practice), and then allow student to complete the step independently (independent practice). Other things to consider in this training are general routines on where to access the device and materials for the learning sessions.

Collect procedural integrity data. Also known as procedural adherence, procedural integrity is the extent to which an intervention is implemented as designed. It is important to make a checklist of critical steps that students should follow and periodically assess if students are adhering to these steps. Figure 2 provides an example of steps that the teachers should like students to complete when engaged in the technology-based learning session.

Figure 2. Procedural integrity checklist for students engaging in iPad Sight Word app intervention

Procedural Integrity Checklist

Implementer: Student: _____ Observer: _____

Date: _____ Time: _____ Session: _____ (Words #: ____ to ____)

Instructions:

1. Time the length of the session as you collect the data.
2. Indicate whether or not implementer (student) performs each of the steps below with a tally mark for each word, and looping around for repetitions.
3. Write comments, observations, or suggestions in space provided.

	Word 1	Word 2	Word 3	Word 4	Word 5
Student looks at and tries to read the word					
Student taps on the word, listens to the word, and says the word					
Student writes the word, and says the word					
Student records the word, and listens to the recording					
Student says the word before moving on to the next word					
Student does not make significant errors in speaking or writing the word					

Notes/ Comments: _____

Monitor progress periodically. As with evaluation of any program, teacher should monitor progress periodically and use these data to change, modify, or continue the intervention. Many educational apps allow teachers to create individual student profiles and track progress. Some apps allow to export the data in an email as well.

Websites

<http://www.freetech4teachers.com/>

Richard Byrne presents free tools for teachers across a variety of disciplines in simple, clear instructions.

<https://luisperezonline.com/>

Luiz Perez focuses on inclusive technology for individuals with disabilities.

<http://lastbackpack.com/>

Zachary Walker provides a tool a day and inspiration for those getting started with technology.

<http://alicekeeler.com/>

Alice Keeler is an expert on all things Google and shares her tips on integrating all the tools that Google has to offer into the classroom.

<http://www.coolcatteacher.com/>

Vicki Davis shares ideas, strategies, and resources on all things technology.

References

- Lorah, E. R., Parnell, A., Whitby, P. S., & Hantula, D. (2015). A systematic review of tablet computers and portable media players as speech generating devices for individuals with autism spectrum disorder. *Journal of Autism and Developmental Disorders, 45*, 3792-3804. Doi: 10.1007/s10803-014-2314-4.
- Musti-Rao, S., Lo, Y., & Plati, E. (2015). Using an iPad® app to improve sight-word reading fluency for at-risk first-grade students. *Remedial and Special Education, 36*(3), 154-166. DOI: 10.1177/0741932514541485.
- Park, S. Y., Nam, M-W., & Cha, S-B. (2012). University students' behavioural intention to use mobile learning: Evaluating the technology acceptance model. *British Journal of Educational Technology, 43*(4), 592-605.
- Project Tomorrow. (2012). *Mapping a personalized learning journey: K-12 students and parents connect the dots with digital learning*. Irvine, CA: Author. Retrieved from http://www.tomorrow.org/speakup/pdfs/SU11_PersonalizedLearning_Students.pdf
- Statista. (2016). *Apple iPhone's market share of new smartphone sales worldwide from 2007 to 2016, by quarter*. Hamburg, Germany: Author. Retrieved from <https://www.statista.com/statistics/216459/global-market-share-of-apple-iphone/>
- Teo, T. (2010). Examining the intention to use technology among pre-service teachers: An integration of the Technology Acceptance Model and Theory of Planned Behavior. *Interactive Learning Environments, 20*(1), 3-18.
- Teo, T., Ursavas, O. F., & Bahcekapili, E. (2010). Efficiency of the technology acceptance model to explain pre-service teachers' intention to use technology: A Turkish study. *Campus-wide information Systems, 28*(2), 93-101.

Recommended citation:

Musti-Rao, S. & Walker, Z. (2017). *Use of mobile technology in the classroom*. Retrieved from: <http://www.council-for-learning-disabilities.org/infosheets-supporting-translation-of-research-to-practice>.

Council for Learning Disabilities CLD grants permission to copy this article for educational purposes. Other Info Sheets are available on our website (<https://www.council-for-learning-disabilities.org/infosheets-supporting-translation-of-research-to-practice>).