Handheld Devices in Education

Megan Mallon

EDCI 750 Emerging Technologies

Dr. Clark Harris

Kansas State University

April 22, 2011

Introduction

Imagine yourself as a third grade student in an elementary school. You are struggling with your multiplication facts, so you sit for a few minutes to do drill and practice. Next, you begin your language arts lesson reading a Reader's Theater play with a partner, and then share the play with strangers from all over the world. Immediately after, you sit down to work on a science project, while observing the lecture your teacher gave last week. This scenario does not seem so different from a typical classroom. But now imagine that each of these educational activities can be completed using a single technology tool.

Currently, a wide variety of technologies are available to classroom teachers. While each different piece of technology can benefit educators and students in different ways, one technology can provide many of these advantages in one tool: a handheld device. Handheld devices come in varied forms, but all offer a wide variety of resources for both teachers and students. Handheld devices have been around for many years, but they are finally becoming more prevalent in classrooms, as can be seen by the situational examples later in this paper. There are many reasons for implementing handheld devices into classroom curriculum. They have proven to be beneficial for students, particularly in the areas of student collaboration.

Explanation of the Technology

The SouthEast Initiatives Regional Technology in Education Consortium (SEIRTEC) explains a handheld device as "a small computerized device that fits into the palm of the hand, and is designed for mobile computing" (SEIRTEC, 2002, p. 3). Commonly, a handheld device can also be referred to as a mobile device; meaning, it has the ability to be moved from spot to spot easily. Handhelds generally have the ability to be connected wirelessly to an internet connection, which opens up many resources that can be made available to students in the form of

applications. The applications could include anything from a reference encyclopedia for a reading class to a graphing application for math or science.

Several types of handheld devices are available for classroom use. While the Palm Pilot was a popular handheld in the early 2000s, it is not quite as prevalent in today's market. Apple's iPod Touch and iPad are two examples of handheld devices that are used in many educational institutions. Similar to these are Samsung's Galaxy Tab and Motorola's Xoom Tablet. These handheld devices all range from $250-$699, with the Galaxy Tab currently being the cheapest. While there is a cost to obtain a handheld device, many educators consider them to be a good deal, particularly when compared with the cost of a laptop computer.

Another cost that should be considered when bringing a handheld device into the classroom is that of the accessories. While some accessories are optional, such as special headphones or speakers, there are several accessories that are necessary to get the most out of the handheld device. For example, each device will need a power cord. Generally, these cords will come with the device, but more may be needed in an educational setting. One option for charging multiple devices at a time is a mobile cart, such as the one available for a class set of the iPod Touch from Apple, Inc. (Apple, Inc., 2011). Most educators will also likely want a cord that will transfer data back and forth between the handheld device and a computer. This may also require an additional initial cost.

There are several options for acquiring handheld devices for a classroom. Most devices can be purchased from a company website; www.apple.com or www.samsung.com. Retail stores, such as Best Buy, Wal-Mart, or Target are an option, although educator discounts are more likely available when purchasing through a company website. For example, the Apple Store offers an educator's discount on all products and their accessories. For schools facing

budget cuts, there are also grant opportunities for receiving handheld devices for their classroom. For example, the grant website Donor's Choose (www.donorschoose.org) has provided many handheld devices for classrooms, with the funds provided by donors. This is a good way for educators to still have the opportunity to work with handheld devices in their classroom, despite their district not being able to afford them.

Uses of the Technology

The variety of features that are provided by handheld devices are what particularly appeal to educators. While handheld devices are commonly used by teachers and students as a communication tool or a tool to access multimedia (Cheung & Hew, 2009), there are other applications and features that can be useful in education. For example, a few of these notable features include a calculator, a calendar, a voice recording function, and a notepad. Both student and teachers can use all of these features.

Educator Uses

For personal use, many educators use a handheld device for administrative tasks (SEIRTEC, 2002). Teachers can use the calendar feature of their handheld device for keeping track of their extensive, and often complex, schedules. This could include anything from staff meetings and professional development opportunities to student IEP meetings or classroom field trips. The iPod Touch even gives teachers an opportunity to keep multiple calendars (i.e. both a professional and a personal) on the same device (Apple, Inc., 2011). Teachers using other calendars, such as Google or Outlook, will tend to have a mobile application. They can also be easily synched from a teacher's computer to their handheld device.

Educators may also find themselves more organized with the use of a handheld device. Contact lists with students' personal information can be stored on the handheld for easy access,

no matter where a teacher may be. This can be especially helpful if a class is on a field trip or

away from the school, and a teacher needs immediate information on a student. Another positive

aspect for teachers using a handheld device is the simplicity of grade keeping. Having an

application for grade keeping allows for seamless transition from the handheld to the computer,

as well as offering the teacher mobility of being able to take their handheld device home.

Student Uses

Student uses of a handheld device range from organizational functions to educational

applications. Special education students can benefit from the fact that teachers can record a

lesson using the device's video feature that can be replayed as often as the student needs.

High school students could also use the calendar feature to keep track of their assignment

due dates, similar to the way educators use it to stay on top of activities and requirements. The

"unique features of a [handheld] device engage students in learning activities that might not be

easily achievable with traditional techniques" (Patten, Sanchez, & Tangney, 2006, p. 298).

There are also many educational applications that can be downloaded to a handheld

device. Every subject has applications available; these applications can either be drill and

practice or they can require higher-level thinking from students. The Monroe 2-Orleans Board

of Cooperative Educational Services, in Rochester, NY, has created a collection of electronic

mathematics materials for special education students (Fasimpaur, 2005). It is their hope that the

use of these materials on a handheld device can help students in a way that traditional methods

cannot. As one teacher in Fasimpaur's (2005) case study said, "Many students who had

struggled before were more engaged in the task" (Monroe 2-Orleans BOCES section, para. 9).

Another great example of students using their handheld device for an authentic activity is

the "Mystery in the Museum" activity in Greece (Cabrera, Frutos, Stoica, Avouris, &

Dimitriadis, 2005). In this activity, students sync their handheld to receive different pieces of information. As they move through the museum (in this case, a historical museum), the students gather clues and evidence based on their assigned task. They use the handheld to record their information and at the end of the day all students group back together to share their evidence. As a whole, they then try to solve the Mystery in the Museum. This is a great activity for using handheld devices because, "the activity is not invasive of the environment, as no visible intervention is required in a museum, and the scenario can be adjusted for many different [types of] museums" (Cabrera et al., 2005, p. 3).

Reasons for Implementation

Handheld devices are making huge transformations in classrooms. They have proven useful in many educational situations, one of which is in improving test scores for students that have handheld devices available on a daily basis. Having the handheld devices immediately accessible in the classroom, as opposed to visiting a computer lab for computer use, gives students more opportunities to benefit. As Roschelle (2003) says, handheld devices "enable a transition from the occasional, supplemental use associated with computer labs, to frequent and integral use of portable computational technology" (p. 2). There is also a strong emphasis on cooperative learning and collaboration between students. The educational applications available for handheld devices will give students the opportunity to interact with their surroundings, in activities that are collaborative in nature (Patten, et al., 2006).

Improved Test Scores

Since handheld devices can be used in so many varied ways, they are often cited for increased tests scores for students. In one California middle school, a teacher tried using a program called Qwizdom (Fletcher, 2010) with social studies students. In this activity, students

are using their handheld device as a clicker. A clicker allows for the teacher to ask a question related to the curriculum, and the students can then input their answer on their handheld. Their answers are projected to a screen, and a teacher can see who has or has not answered the question. In this way, all students can answer without the pressure of raising their hand in front of peers. After using this program, the students' scores on the California state standardized tests jumped 84 percent (Fletcher, 2010).

A third grade class in Canby School District, which is in Oregon, also achieved higher test scores after preparing with handheld devices. After piloting a program in which each third grader in the class was provided with an iPod Touch, test scores raised dramatically. The number of students meeting standards on state testing rose by an average of 2-3% when they participated in the 1:1 iPod Touch initiative (Grigsby, 2010). This was also true for subsets of students, including ELL students and students with special needs including learning disabilities and autism.

Student Collaboration

One benefit of using different technologies is student collaboration, and handheld devices are no different. Collaboration can be an excellent opportunity for students to work together to solve problems, as well as giving them lifelong skills for collaboration in their future education and, eventually, careers. According to Richardson (2010):

When today's students enter their post-education professional lives, odds are pretty good that they will be asked to work with others from around the globe collaboratively to create content for diverse and wide-ranging audiences. Odds are also pretty good that they are going to need to read and write effectively in linked environments as they locate,

analyze, remix, and share the best, most relevant content online for their own learning. (p. 148)

On a handheld device, "collaborative applications aim to encourage knowledge sharing while making use of the learner's physical context and mobility" (Patten, et al., 2006, p. 299). Edmodo is a web tool, also available as an app for a handheld device, that allows for collaboration between student and student, as well as student and teacher. A teacher may use it for posting homework assignments, and students may use it to cooperatively complete an assignment, such as a literature circle novel discussion.

Another example of students using handheld devices for collaboration is in a science classroom. Roschelle gave the example of a class doing water quality evaluations (as cited in Vahey & Crawford, 2002, p. 25). Students separately collected their data, and then combined their findings with one another using a Bluetooth type software. This method transforms an otherwise independent scientific observation into collaboration.

Conclusion

Handheld devices are becoming an increasingly popular technology tool in classrooms due in part to their many educational advantages. Recall the scenario in the introduction. While most of the activities listed in the situation could have been performed without a handheld device, the benefits of this technology are clear. There are far more educational applications available on a handheld device for students than could ever be hand-created by a teacher. Additionally, "using handhelds equipped with appropriate software and connected by a wireless network to the internet exposes students to a rich variety of web resources that can help them learn abstract[…]concepts" (Shotsberger & Vatter, 2001, p. 111). Handheld devices are proven to increase student test scores, and provide many opportunities for student collaboration.

Handheld devices are also extremely beneficial to educators, who can use them for organizational and administrative tasks. Handheld devices can benefit both the teaching and the learning experience, and definitely deserve a place in all classrooms.

References

Apple, Inc. *Apple in education profiles*. (2010). Retrieved from

http://www.apple.com/education/why-apple/

Cabrera, J.S., Frutos, H.M., Stoica, A.G., Avouris, N., & Dimitriadis, Y. (2005). Mystery

in the museum: collaborative learning activities using handheld devices. *Proceedings of*

the Mobile Human Computer Interaction, http://portal.acm.org/citation.cfm?id=1085843

doi: 10.1145/1085777.1085843.

Cheung, W.S., & Hew, K.F. (2009). A review of research methodologies used in studies

on mobile handheld devices in K-12 and higher education settings. *Australasian Journal*

of Educational Technology, *25*(2), Retrieved from

http://www.ascilite.org.au/ajet/ajet25/cheung.html

Fasimpaur, K. (2005). Handhelds in education case studies. Retrieved from

http://www.k12handhelds.com/casestudy.php

Fletcher, J.L. (2010, May 28). School uses hand-held technology to improve test

scores. *Orange County Register*, Retrieved from http://articles.ocregister.com/2010-05-

28/education/24630170_1_test-scores-answer-questions-students-plug

Grigsby, J. (2010). iPod program helps school test scores. *O'Reilly Media*. Retrieved

from http://radar.oreilly.com/2010/09/ipod-pilot-program-boosts-thir.html

Patten, B., Sanchez, I.A., & Tangney, B. (2006). Designing collaborative, constructionist

and contextual applications for handheld devices. *Computers & Education*, *46*(3),

Retrieved from http://www.sciencedirect.com

Richardson, Will. (2009). *Blogs, wikis, podcasts, and other power web tools for*

classrooms. Thousand Oaks, CA: Corwin Press.

Roschelle, J. (2003). Unlocking the learning value of wireless mobile devices. *Journal of*

    Computer Assisted Learning, *19*(3), Retrieved from http://onlinelibrary.wiley.com

    doi:10.1016/j.compedu.2005.11.01

SEIRTEC. (2002). Handheld devices: The basics. *SEIRTEC News Wire*, *5*(2),

    Retrieved from http://www.seirtec.org/publications/NewsWire/Vol5.2.pdf

Shotsberger, P.G., & Vatter, R. (2001). Teaching and learning in the wireless

    classroom. *IEEE Computer Society*, *34*(3), 110-111. Retrieved from

    http://www.uncdub.net/numina/documents/internet%20watch%20final.pdf doi:

    10.1109/2.910902