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Using mobile devices in education

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Using mobile devices in education

Abstract

With the changes in technology over the last few years, it is important to consider mobile devices because they offer a variety of applications to enhance what is already being taught in the classroom. The review discusses how today's mobile devices have many capabilities that are pertinent to education and the enhancements to current curriculum. The review also covers the challenges that need to be addressed in order for the mobile devices to be an asset to the classroom. The resources used for the discussion include journal articles, books and literature reviews. The review will give an insight to how the devices can be used in school and be advantageous to the classroom.

USING MOBILE DEVICES IN EDUCATION

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ABSTRACT

With the changes in technology over the last few years, it is important to consider mobile devices because they offer a variety of applications to enhance what is already being taught in the classroom. The review discusses how today's mobile devices have many capabilities that are pertinent to education and the enhancements to current curriculum. The review also covers the challenges that need to be addressed in order for the mobile devices to be an asset to the classroom. The resources used for the discussion include journal articles, books and literature reviews. The review will give an insight to how the devices can be used in school and be advantageous to the classroom.

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INTRODUCTION

“On a planet with around 6.8 billion people, we’re likely to see 5 billion cell phone subscriptions this year” (Whitney, 2010, ¶1). Mobile devices can be defined as cell phones or MP3 players (e.g., iPod Touch) of any kind and allow people to stay connected with family, friends and the entire world. Mobile devices have many uses and have become a necessity in many people’s lives. These instruments are capable of performing just about anywhere and at anytime.

Technological device convergence has been a topic of interest concerning mobile devices. Convergence involves taking separate technologies and creating one product that can perform these multiple technological applications. An example would be today’s mobile phone, which can make calls, search the Internet, record voices, take pictures and video, perform calculations, and is capable of running a variety of applications downloaded to the device. Mobile devices today “have nothing to do with making phone calls. Instead they expand the capacity to keep us in touch with information and activities while we are on the go” (Johnson, Levine, & Smith, 2009, p. 8).

Pocket-sized mobile devices bring the functionality of a laptop computer to each student (Johnson et al., 2009). Because of the capabilities of mobile devices, the device can be considered a computer. This can be another way to achieve the one-to-one ratio with students to laptops that is sweeping the schools today. What many district administrators do not understand is that these mobile devices can be considered as a laptop in each student’s hands. For this review, mobile device will be defined as a

communication device that users can “conveniently keep with them at all times” (Anderson & Blackwood, 2004, p.3). Cell phones fit into this category of mobile devices.

Students are wrapped up in their technology devices and want to be connected to the world around them at all times. According to Prensky (2001), students today have spent the majority of their lives surrounded by and immersed in a variety of technologies. This technology includes computers, videogames, mp3 players, web cams, Internet, cell phones and other toys and tools of their digital age. “Immersion in this technology-rich culture is said to influence the skills and interest of digital natives in ways significant for education” (Bennett, Maton, & Kervin, 2008, p. 776). Students want to use their technologies in their studies to help them learn.

Students today should develop 21st century skills to be successful in the world after completing school. The graphic below shows the skills students should learn before leaving school.

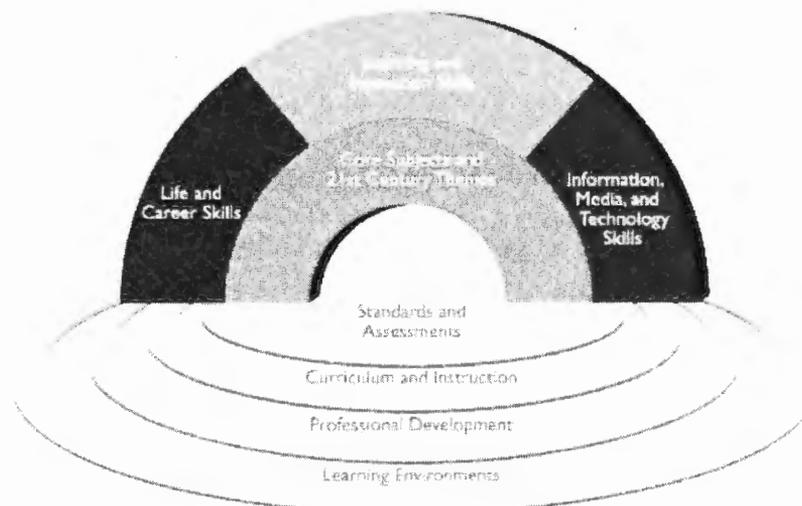


Figure 1. Source: Partnership for 21st Century Skills

For students to learn the 21st century content and skills, “students must use 21st century information and communication technology” (Norris & Soloway, 2009, Progress Takes

More than Laptops section, ¶1). Mobile devices provide technology tools that can help educators teach these skills to students.

This topic analysis is important because many of today's students are carrying mobile devices in their pockets and purses and use them to communicate in many different ways. Schools struggle with access to computer labs for the students to use. An answer to access might be in the students' pockets. Teachers in classrooms around the world also fight with students and their cell phones because of the distraction the device can cause. Can incorporating mobile devices into the classroom increase the opportunities and relevance for students?

The results of this review can inform teachers in how they can use mobile devices with their curriculum. Challenges that accompany using new technologies in the classroom also need to be considered. Can the advantages outweigh the challenges?

This review will examine three aspects when considering implementing mobile devices into the classroom. First of all, the paper will address the capabilities of today's mobile devices. Secondly, it will consider how mobile devices can enhance current curriculum and allow for new applications in the classroom. Lastly the paper will discuss the challenges that incorporating mobile devices may bring to the classroom. The three questions that this review will answer include:

1. What are the capabilities of mobile devices?
2. How can mobile devices enhance curriculum?
3. What are the challenges of mobile devices?

METHODOLOGY

In researching the use of mobile devices in education, the author found a variety of resources. The author searched electronic databases using keywords to search and locate online sources. The author began research using the University of Northern Iowa Rod Library. Through the library the author was able to access a variety of databases. One major online database used was Academic OneFile. Another source of authoritative resources was Google Scholar. The author used various Boolean search techniques to locate relevant research. The key words used to find information included: *mobile devices, convergence, smart phones, ubiquitous learning, mobiles in education, and cell phones in the classroom*. The 2009 Horizon Report (Johnson et al., 2009) was helpful as the author searched for resources. The Horizon Report not only supplied information on mobile devices but also provided Web links that were helpful when researching.

The author created specific criteria for locating information relevant to the topic of mobile devices in education on the World Wide Web. Acceptable resources were limited to those written from the year 2001 to the present. While using Google Scholar the author paid special attention to the number of times a resource was cited. The *cited by* link which appears by each reference in Google Scholar identifies the quantity of other papers that have referenced each specific article. This *cited by* number helps establish the creditability of resources by quantifying the acceptance of each reference by others in the field. The author found a book that was the cornerstone of the analysis and discussion part of the paper. Liz Kolb's book *Toys to Tools: Connecting Student Cell Phones to Education* (Kolb, 2008) was a rich source for ideas of incorporating cell phones into the curriculum. The International Society for Technology in Education (ISTE) published the

book in 2008. ISTE is a trusted source for implementing technology into education. The non-profit group authored the National Educational Technology Standards (NETS). This collection of standards establishes benchmarks for students, administrators, and teachers when implementing technology.

Overall the author found over thirty relevant resources for this paper. Professional reports have become more readily available as this topic becomes popular in education.

ANALYSIS AND DISCUSSION

“Mobile technologies define youth today” (Norris & Soloway, 2009, Let the Kids Go Mobile section, ¶4). Students do not leave home without their cell phones because it keeps them connected. Today students are comfortable and successful with their mobile devices. Educators that ignore and do not use them in the classroom are wasting resources available to their students (Norris & Soloway, 2009).

Schools are structured today so that when students walk into the building, they have to power down. They are expected to shut off their cell phones, MP3 players and other electronic devices that they are accustomed to using anytime and anywhere. Students go to school surrounded by old-fashioned classrooms and outdated equipment and supplies (Prensky, 2008). By incorporating mobile devices into the curriculum, teachers will be able to use current technologies and information. Mobile devices can also offer engagement and motivation for students while at school. Capabilities of mobile devices, curriculum enhancements with mobile devices and challenges of incorporating mobile devices will be discussed throughout the analysis and discussion.

Capabilities of Mobile Devices

Today’s mobile devices have changed dramatically since they were first conceived in the 1940s. In the 1970s the first functional cellular telephone was created and the first cellular phone call was placed in the year 1973. But it was not until the 1980s when the device hit the marketplace (Marples, 2008). Over the years the cellular phone has taken on different sizes, looks and uses. Talking on the phone is no longer the cell phone’s only use. The mobile device has many capabilities that can be incorporated into the learning environment. According to Prensky (2005/2006), capabilities of cell

phones are enormous including but not limited to camera, video, voice, Internet, text messaging, downloadable applications, and global positioning systems. What does this all mean for education?

Camera

The camera feature on mobile devices allows for taking pictures in various settings. Some settings include but are not necessarily limited to changing the scene and flash modes, white balance, color effects, picture size and quality and focus mode. Many cell phones have the capability for a storage card or have a built-in memory so that the pictures can be saved for use later. The owner of the mobile device has the ability to personalize his/her mobile device to personal preferences. Users can also share their photos with contacts in their address book or they can upload them directly to the Internet. The camera features on a mobile device can serve as an educational tool while on a field trip. Students can gather, record, and analyze data while on the scene (Herrington & Herrington, 2007). The same is true for shooting short videos with mobile devices. Users can capture on-scene video. Devices that are connected to the Internet allow for users to directly upload the videos to YouTube or other websites. These videos can then be loaded into various video-editing programs for the user to edit and create videos.

Voice

The voice-recording feature allows users to record their voice. This feature can be used to not only record voices but can also be used to interview someone. Other capabilities of the voice recorder include access to other languages and vocabulary training (Prensky, 2005/2006). The voice recording can be shared with contacts or

uploaded to the Internet to share with the world. Some mobile devices come equipped with voice recognition software. This will allow the user to control some aspects of the device with voice. Text messaging can also be done with voice recognition software.

Internet

Many mobile devices today are also equipped with technology that allows for accessing the Internet at anytime and anyplace. Websites are now creating sites that are compatible with mobile device screens. This on-the-go access gives the user constant connection with friends, family, and the world. Students without Internet access at home are able to connect to the Internet with the mobile device if the plan allows. “The cellular system gives us connectivity at school, but it also provides connectivity outside the school for the students who otherwise would not have it” (Menchhofer, 2010, Results section, ¶1). This connectivity provides a source of Internet connection to those that do not have it at home. Some school networks are available through the school access on the mobile device (Hartnell-Young & Heym, 2008). By allowing students to be connected, equitable access can be better addressed.

Text Messaging

Text messaging or short messaging (SMS) is a common way of communication on mobile devices. Text messaging has replaced some instances of talking on the phone especially amongst teenagers. Text messaging allows for short character messages to be sent to other users. The message becomes a back and forth conversation amongst users. “Teachers could deliver interactive lessons over a cell phone and use text messaging to quiz or tutor students” (Prensky, 2005/2006, p. 4).

Applications

According to the 2009 Horizon Report (Johnson et al., 2009), third-party applications are available at a limited cost and are easy to obtain. Many applications are available to mobile device users. These range from games, communication, finance, health, productivity, reference, and social tools. Many of these applications can be used with current curriculum.

Bluetooth allows users to talk on the phone hands free. Bluetooth is an open wireless protocol for exchanging data over short distances from fixed and mobile devices. Bluetooth allows for the transferring of files as well. With the Bluetooth feature, students are able to share information with each other (Read, 2010).

Applications such as calculators, global positioning systems (GPS), and stopwatches are also available on many mobile devices. According to Hartnell-Young and Heym (2008), the spontaneity and efficiency of the mobile device is useful. If there is something that needs to be calculated or timed, students can pull out the mobile device to perform the functions. These tools in combination with the preceding allows for just about every student who has a mobile device to have a computer in their pocket.

The graph below breaks down the most popular features on students' mobile devices. It shows the percentage of teen cell phone owners who have used the functions on their cell phones during the months of June and September 2009 (Kharif, 2008).

Photo-taking and -sharing are most popular features on teens' cell phones

The % of teen cell phone owners who have used the following functions on their cell phones

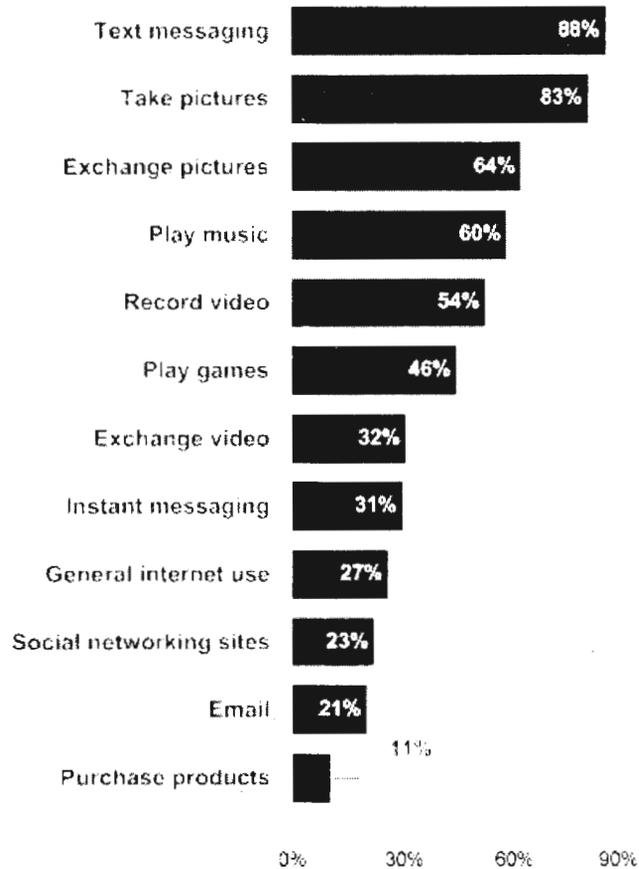


Figure 2. Source: Pew Research Center's Internet and American Life Project, Teens and Mobile Phones survey, page 56

Mobile devices have a variety of capabilities pertinent to education. “From the perspective of many educators, mobile devices have the potential to transform teaching and learning by engaging more students more deeply in lessons and promoting anytime, anywhere learning” (Bushweller & Chronister, 2010, p.10). The following section will address the ways that mobile devices can be used in current school curriculum.

Can Mobile Devices Enhance Curriculum?

The thought of allowing a student to learn in the classroom with a mobile device can be hard for teachers to comprehend. With all of the capabilities of a mobile device and the variety of learning within a classroom, a cell phone can be handy tool for students to use. Many subject areas can benefit from this technology tool if the teacher can look at it as just that, a technology tool.

Mobile devices offer new ways to collaborate, learn, and communicate (Milrad & Spikol, 2007). These tools provide many additions to what is already done in the classroom. Not only does the mobile device offer additions to the curriculum but students find technology to be a motivating factor and many of them carry mobile devices. “According to a survey of 700 teens published in April of 2008 by the Pew Internet and American Life Project, 71% of respondents already own cell phones, while only 59% own computers” (Kharif, 2008).

Curriculum Capabilities

A mobile device can become a way for the students to broadcast what they are learning about within the classroom. With the capability of a sound recorder and the ability to upload to the Internet, podcasting can be a great tool for teachers to use with their students. “A podcast is an audio broadcast on the Internet that can be downloaded to a portable MP3 player” (Kolb, 2008, p. 23). Podcasts can be found on various websites and through iTunes among other places. There are websites that allow users to call in from their cell phone and record as a podcast. A Spanish teacher from a Kansas high school used podcasting and cell phones for her Spanish three and four classes. Students called from outside of the school day and recorded themselves speaking in Spanish. The

audio was then directly posted to the class website. This is a great way for students to practice their Spanish speaking skills outside of the school building (Trotter, 2009). This teacher used GCast for this assignment. Although GCast has changed over recent years, there are other applications that can provide similar functions.

There are different applications available to use in the classroom for podcasting; these include but are not limited to, Gabcast (www.gabcast.com) and Hipcast (www.hipcast.com) (Kolb, 2008). These two applications allow the user to upload audio files and create podcasts. Teachers are able to set up different channels to which the student can subscribe. Students would also be able to call in from their mobile device and record on to the channel. Gabcast uses Really Simple Syndication or RSS. With this feature students, family and community members can subscribe and get the updates when new podcasts are published (Kolb, 2008). The privacy settings allow the teacher to keep the student's work private. One feature that sets Gabcast apart from the others is that the virtual conference calling option would allow for connections to remote students. Weblogs can be recorded using Hipcast. These can be video blogs that are recorded using a Web cam and then can be uploaded to the site.

Teachers can use podcasting as part of their classroom instruction. For example, a K-8 teacher from Michigan used Gcast to create radio theater podcasts with her students. She used one cell phone for the entire class. The students called in and created their portion of the podcast. Once the students recorded, the teacher then went in and edited and created a podcast with the students' work. The final podcast was then embedded into the school's website to be shared. "This demonstrates that even a single cell phone in the classroom can be an innovative tool" (Kolb, 2008, p. 37).

According to Herrington and Herrington (2007), one educational activity where mobile devices could be used is on class field trips. The use of the camera on a mobile device would allow students to take pictures of specific things while on the move. On a nature walk, students could take photographs of different types of leaves, trees, and flowers. Students could also capture videos of creeks, birds, and other nature things that they encounter. Conducting interviews while on the field trip could be done with the mobile device using the audio feature. Students could have a list of questions that need to be answered while on the field trip. The responses to the questions could be answered while on the trip through the mobile device. They can phone-in their reflections and responses into the class webpage. Upon returning to the classroom, students could upload the photographs and videos to a class blog, website, or create videos for a research project. Students would be able to share their findings with the rest of the class and also with family and friends outside of the classroom. This is one way of bringing learning from the classroom outside the confines of the school building. Cell phones can also be used to track students on the class trip. Chaperones can have the students' cell phone numbers so that the students can be reached at all times (Kolb, 2008).

The bluetooth feature on mobile devices can be used to share images and other data with other students within the classroom. The information can also be shared with a computer that has bluetooth capabilities. Easily sharing the information that a student collects while out on a field trip will benefit the teacher and students in the classroom.

Math classrooms can see benefits from mobile devices being used in the classroom. According to Richtel and Stone (2009), students can use the cell phones to video record themselves working on math problems. Students, while working through the

problem, can talk about the steps that they are taking to calculate the problem. The videos can then be uploaded to a website where other students in the class can access them. With the students doing the problems step-by-step and showing other students, the students can use this as a resource outside of the classroom while working on their homework. Some students may learn the math concepts better this way because of the language that another student may use within the video.

Mobile devices also offer sophisticated calculators. Nearly all mobile devices come with a calculator. These calculators can range from simple mathematical operations available to more advanced operations. Applications can be downloaded to help support the math curriculum. For example, Sketch2Go allows users to sketch graphs on mobile devices. Graph2Go allows for working with functions on the mobile device. Using the mobile device to work through math curriculum allows the users to share the work with the teacher and other students (Botzer & Yerushalmy, 2007). These mobile device calculators can be used to incorporate math skills into every classroom. By letting the students use their mobile device as the calculator, this eliminates the cost of supplying calculators within the classroom.

Geometry students can benefit from using mobile devices in the classroom to create digital stories. For example, students can take real-life pictures of various right, obtuse, and acute angles and share them with the class. The teacher can create a Photobucket (www.photobucket.com) account to store the pictures taken by the students. When the students return to class they can create a slideshow on Photobucket using the pictures of the various angles (Kolb, 2008). The real-world application of the angles allows for relevance in the classroom.

Art students can use mobile devices within the art classroom and curriculum. Students can use the camera on the device to take pictures of art work that they are currently creating in the classroom. The pictures can then be taken home to show their family what they are learning and working on in the classroom. Students can also use the images to create an online portfolio of their artwork throughout the year. This can be used as a means to get into an art college. The steps that a student takes to create a specific piece of artwork can be documented with a cell phone also either with video or the camera. They can use the documentation to show others how to create a similar piece or show their teacher the steps that they took to create the artwork (Hartnell-Young & Heym, 2008).

Brainstorming with a cell phone can be a collaborative activity that benefits the classroom. A website called Wiffiti (www.wiffiti.com) allows teachers to create a web screen that they can share with their students at no cost (Kolb, 2008). A teacher can find out what the students know about a topic before the instruction begins. Students can text message the web screen using a special code. The live screen is updated continuously so that all of the students' ideas are posted to one website. There are privacy controls that allow the teacher to approve the ideas before they are posted to the website. The website then can be reviewed at the end of the instruction to see how much the students had learned. Joe Wood, a seventh and eighth grade teacher in California, uses Wiffiti to see what his students know about a topic (Kolb, 2008). He poses the question and then the students are able to text message the webpage. This website can also be used while on field trips or outside of the classroom. Students can text their notes and observations to a web screen that the teacher has previously set up. Once back in the classroom, the teacher

and students can look at what was observed and have a group discussion. With an activity such as this one, students can post their ideas right away instead of trying to remember them when they get back to the classroom.

Mobile devices can assist English Language Learners (ELL) in performing many tasks. ELL students can look up words that they encounter that they do not understand. Students will be able to practice their speaking, listening, and writing all through a mobile device. Students will be able to record themselves speaking words that they struggle with. Students could record their teacher speaking the correct form of the word. This would allow for practice at home or on the go and brings learning outside the walls of the school building. It would allow for students to compare their pronunciation with a native speaker to see where they are struggling (Johnson et al., 2009). English language learners can also help their family at home to learn the language. With the students learning at home with their families, it will only improve the language of the student.

A media specialist in a New Jersey middle school used mobile devices to help English Language Learners and Special Needs students learn English in an after school program. She used music to help the students grasp words in the English language. Grace Poli convinced her school district to buy twenty-four mobile devices for her to use within her classroom. Students would listen to music on their devices and then worked on English skills. Students corrected the bad grammar, discussed the songs' meanings, and read the lyrics out loud (Ullman, 2010). She also had students listen to various audiobooks in their native language and then in English. In addition, the students would interview each other using the voice recorder which helped them practice their English speaking skills. According to Poli (Ullman, 2010), "They had to answer in complete

sentences. It was all very hands-on and engaging” (p. 18). Results from this classroom were astounding. After one year of using the mobile devices, half of the students transitioned into English-only classes. The success of the first year program helped Poli incorporate a mobile device class into the school day (Ullman, 2010).

Science classrooms can use mobile devices in a variety of ways to enhance learning experiences. Many mobile devices are equipped with a stopwatch or a timing device. While doing experiments in science classes, students can use the stopwatch for timing their test. Photographing the changes and results as the experiment goes on is another way to use the mobile device to enhance science classrooms (Hartnell-Young & Heym, 2008). With the photos, students can see the gradual change of an experiment. For example, students can monitor plant growth and take pictures at various stages. They can also measure the time it takes for the changes and growth to take place.

Physics can be studied through the use of cell phones coupled with Audacity. Audacity (www.audacity.sourceforge.net) is a free audio-editing tool available as a download from the Internet. Classrooms studying sound can benefit from the use of these two technology tools. Students can record sounds that they hear in their every day life with the cell phone. These sounds can be put into Audacity where the students and teachers can study the pitch, frequency, sound waves, speed of soundwaves, and octave (Kolb, 2008). This activity relates to the students’ lives and also uses the technology as a motivation to study sound.

With the new applications that can be downloaded for a minimal price, students can even practice their musical instruments. According to the 2009 Horizon Report (Johnson et al., 2009) simulators can be downloaded for instruments such as the piano,

guitar, drums and others. This would “allow students to practice their fingering and chords and even compose simple pieces” (Johnson, et al., 2009, p. 9). Students can even practice reading the different notes within a music piece. Furthermore, voice recordings can be an asset to the music program. Students will be able to record and playback and even upload their recordings to the Internet for future usage.

Music can also be created using a mobile device. The ringtone industry is already a multi-billion dollar business. Students could create their own ringtones for others to use while learning about the parts of making music (Prensky, 2005). Creativity and imagination are great skills for students to be learning and using in everyday classrooms and the mobile device can bring the skills to life.

Journalism teachers and students can enhance the school’s writing programs with mobile devices. Teachers can set up a Flickr (www.flickr.com) account for students to post pictures while at various school events and newsworthy situations. The unique address that the teacher creates can be a place for students to upload the pictures that they take with their mobile devices. This type of journalism has been coined “mobile citizen journalism” (Kolb, 2008). “Mobile citizen journalism is everyday people documenting significant events and situations” (Kolb, 2008, p. 179). Students can then retrieve the pictures to add to the school’s newspaper or other literary projects.

Text messaging or short messaging (SMS) can be used in various ways to accompany what is already being done in the classroom. “Teachers can use text messaging as prompts for course requirements, polling classes, and pop quizzes” (Herrington & Herrington, 2007, p. 3). A website, Poll Everywhere, (www.polleverywhere.com) allows teachers to post a multiple-choice questionnaire or a

poll where the students can answer using their cell phones (Trotter, 2009). Students use text messaging everyday. In fact texting has grown at the greatest rate for teens in the last four years and it is the core of their communication (Lenhart, Ling, Campbell, & Purcell, 2010). This would be one way to communicate with students to remind them of assignments, projects, and other important school data throughout the semester. Students would have the ability to text homework questions to fellow classmates or the teacher if he/she allows.

Organizational Capabilities

Calendars on mobile devices can definitely keep students organized. Using the calendar feature on the mobile device teaches students to be organized while in school and later in life. This real-world life skill is important as students become adults. Students can use the calendar that is located directly on the device or can use other services such as Soshiku (www.soshiku.com). This service was created by a seventeen-year-old student who needed to find a way to stay organized (Trotter, 2009). Soshiku allows the users to text or e-mail message their account to post assignments, projects, and test dates. Users can set it up so that they receive project due notices to their mobile devices. Calendars like this can help the disorganized student(s) keep track of their school work.

The built-in alarm or reminder feature on mobile devices is also helpful. Students can set the reminder at any increment of time to alarm them of upcoming assignments, projects, and events.

Mobile devices can be seen as organizational tools for teachers, students, and families. By accessing the Internet on cell phones, students and families can gather relevant school homework and information. One website called HomeworkNOW

(www.homeworkknow.com) allows families and students to access this type of information from their mobile device (Kolb, 2008). The teacher can input classroom and school information into the website for others to access. This website service has a fee associated with the use of it. Single teacher users costs around forty dollars a year, where a whole school account could cost up to seven hundred dollars.

Classroom Management Capabilities

The voice recorder on mobile devices can serve as a hall pass. Students can get quick permission from their teacher to use the restroom or go to their locker. The student can record the teacher excusing him/her to use the restroom and then if the student is stopped in the hallway they can prove they had permission (Kolb, 2008). Communication with parents can also be accomplished by the voice recording. This communication could concern an assignment, get permission for field trips, or a simple check to see if the student communicated an important announcement. At the secondary level, some students have up to eight different teachers per day. The cell phone provides one communication device for the students and families. It also can be a running record of the conversations between school and home (Kolb, 2008). The communication that can be done with a mobile device can prove to be very helpful when dealing with common issues in the classroom. The other advantage to having the communication on the mobile device is that students seldom lose their mobile phones.

Getting to know students is an important part of being an effective teacher. Cell phones can provide a link between students and teachers. Conducting conferences with mobile devices is one idea. This conference can be about a project that they are working on or discussing concerns a teacher may have. This can help connect student(s) with the

teachers. Teachers can save class time by conducting these types of conferences before or after school (Kolb, 2008). Teachers can also record the discussions and upload them to the Internet for future usage. The recordings can be sent to a private room where only the teacher and students can access it. The documentation can become valuable as the year moves on.

Collaborative group projects are an important part of every classroom. Working together to accomplish one goal is a vital life skill for students. It can be challenging for teachers to keep track of individual contributions during group work. Keeping students on task is not easy either. Mobile devices provide a way to counter both problems. Students can post the group's brainstorming or activities to Gabcast for the teacher to access (Kolb, 2008). Students will be recording the conversations and will more likely stay on the given task. The conversations and documentation can then be sent to the teacher or posted on a website for later access.

Students who are absent from the classroom can miss out on critical curricular lessons and activities. Mobile devices can connect missing students to the classroom. By using the program FreeConferencePro, students can call into class and even participate from their location (Kolb, 2008). The program can also record conferences and be downloaded for future usage. Podcasts can be heard by anyone with access to the profile. Parents can then help their son or daughter with the homework or information assigned. Classroom documentation can be shared through Qipit (www.qipit.com). "Anyone can use a mobile phone to take a picture of handwritten notes, whiteboards, or printed documents and send them to Qipit, where the image is immediately converted to a legible PDF document" (Kolb, 2008, p. 180). For absent students this can be quite handy. The

discussions, activities, notes, and other classroom material can be shared easily. This can help the absent student out tremendously to catch up to what he or she has missed.

When teachers are gone, students do not get the detailed information and interaction that is needed with many curricular areas. A website called YouMail (www.youmail.com) allows for visual voicemail. Teachers can use this to give students assignments while absent from the classroom. It also can provide a way for students to report to the teacher. For example, students can call the teacher's voicemail and leave an audio recording (Kolb, 2008). This can provide a convenient and quick way for the teacher to grade the assignment while away. Students will be on task and on track with the curriculum while the teacher is gone.

Every classroom in every school has struggling students. Mobile devices can help these struggling students by providing a way for students to listen to the classroom information when needed. Classroom lecture and discussions can be recorded with a mobile device and can be immediately posted to an Internet website for use. "Students who need more time to comprehend the information presented in class can download and listen to the podcast as many times as needed" (Kolb, 2008, p. 181). Special education students and teachers can benefit from this use of technology. By being able to listen to the information more than once, a student can fully understand the content of the curriculum. Parents can also listen to the podcasts to help their child(ren) complete a homework assignment.

There are many valuable life lessons that can come along with using a cell phone in the classroom. When using mobile devices in the classroom, students need to understand their calling plan. "Educators must make sure that all students understand the

price structure of their calling plan” (Trotter, 2009, p. 3). This can be a valuable skill for students to learn. Students can bring their plans to the classroom and dissect and discuss each plan’s options. Another lesson that can be taught by educators is mobile device etiquette. This is a group of skills that is not typically taught in school or anywhere. “Technology users need to understand that for us all to function as digital citizens we have to be aware of others around us and how they see us (Ribble, 2009, p. 45). Students need to learn appropriate cell phone protocol which in turn will help the teachers in the classroom when implementing mobile devices.

Other Capabilities

The majority of the preceding text focuses on upper middle school through high school aged students but there are opportunities for preschool and lower elementary teachers to incorporate mobile devices into the learning of students. Parents are giving their child(ren) cell phones at an earlier age because of safety and communication (Kolb, 2008). This allows for the parents to keep track of their children whenever and where ever. Cell phone etiquette can be a focus in the younger grades. Students that are taught the appropriate etiquette will use good judgment when they own a cell phone. The mobile device can also be introduced as a “learning tool rather than a social toy” (Kolb, 2008, p. 186).

Other ideas for using cell phones in elementary grades include using them on field trips, homework with parents, activity centers, and sending projects home. Parents can work on homework with their child(ren) using the mobile device. With the teacher’s instructions, students and their parents can take pictures and recordings of various things in nature to share with the classroom. This brings the learning outside of the four

classroom walls and also provides some real-life application. Parents can also learn from the students on how to use the various applications on the mobile device. Projects can also be sent home through the use of Web 2.0 websites and cell phones. Students can text message their parent(s) pictures of things that they are doing in the classroom.

Lastly, there can be a cell phone activity center within the elementary classroom. Students can create learning podcasts while at the station. These podcasts can be then shared with the classroom, families, and the world. Elementary students have the ability to share what they are learning in the classroom with podcasts (Fryer, n.d.). Another activity for the cell phone is to use the camera and video camera applications on the device (Kolb, 2008). Students can create videos to help other students learn how to perform certain math functions or other skills the students are learning in the classroom. The videos can then be uploaded to a class website for others to use.

Many classrooms and schools can benefit from having a computer for each student. According to Marc Prensky (2004):

“It seems silly, at a time when more and more students walk around with these (mobile) devices, to use tethered computers, or even wireless laptops or tablets to do a new job in what is already an old way. It is time for a new perspective” (p. 2).

Mobile devices can be looked at as a one to one laptop program because of the capabilities of each mobile device. Teachers and students do not have to be dependent upon computer labs for access, they can use their students mobile devices (Corbeil & Valdes-Corbeil, 2007). The advantage of using mobile devices as the students’ computers is that they have these tools with them all the time and can use them for school related

activities (Prensky, 2004).

At any grade level, good preparation and organization is a must on the teacher's part. Teachers will need to inform the parents about the use of the mobile devices in the classroom and outside of school. Students will need to know the ins and outs of the family's cell phone bill and service. This will help to ensure that there are minimal extra charges accrued because of an activity done for school. Communication is key to running a successful integration of cell phones into the curriculum.

Mobile devices offer many new opportunities to the classroom. Many of these applications can be used as supplemental to what is already being taught. According to Docksai (2009), the mobile devices can be a powerful learning tool. The key is to get out of the comfort zone and see what will work in the classroom. According to Marc Prensky (2004), if mobile devices are deeply integrated into the education of students and used creatively, the devices have the power to change and improve education.

Challenges of Mobile Devices

"Cell phones have long been anathema in the classroom, banned as a potential distraction, at best, and as a possible vehicle for cheating, at worse" (Kharif, 2008, p. 26). Teachers struggle with the idea of incorporating mobile devices into their curriculum because of the challenges they can bring to the classroom.

Challenges to cell phone usage within the curriculum should not be overlooked. Before a teacher incorporates new technology into the classroom, challenges should be examined and addressed with the parents and students. Students need to clearly understand the expectations and consequences before the implementation of a mobile device. The following challenges should not be overlooked.

Cheating can be a reason teachers fear the incorporation of mobile devices. Students have the ability through SMS (Short Message Service) to give other students answers. With Smart Phones, students can have access to the Internet to find answers also. The type of testing will determine how much the students can cheat with the mobile device.

One of the unsettling occurrences in many classrooms today is the ringing of a cell phone during instruction (Gilroy, 2004). It is hard to ignore the ringtones and sounds that come from text messages or phone calls. This distraction can take away from the learning of the student receiving the call or message and also the other students in the classroom. It is a distracting interruption that can ruin a class in session.

According to the 2009 Horizon Report (Johnson et al., 2009), mobile devices are already well on the way to becoming a universal tool for communication of all kinds. Text messaging is very popular among students today. This can be a distraction while in class. With the mobile device in their hands, they will want to check constantly for new messages. Students may have a hard time listening to a lecture and staying on task if their mobile device is in reach.

Another challenge that might come about is equitable access to mobile devices. Not all students have a mobile device available to them. "Almost every student carries a mobile device," (Johnson et al., 2009, p. 9) that can be used in the classroom. What do you do with a student who does not carry a device? This can be frustrating for the student and he/she may feel ostracized. Students are self-conscious about this type of thing so teachers will need to be aware that this situation might arise. Non-technical students could feel a sense of isolation (Corbeil & Valdes-Corbeil, 2007). This can be true in any

classroom where a student does not use the devices regularly like other students. The challenge of access can also be an opportunity for students to teach other students about the mobile device.

The media and documents that a mobile device uses may not be compatible with the current technology available in the school. Some of the media created on a mobile device may need to be reformatted so that it is usable at the school (Corbeil & Valdes-Corbeil, 2007). This challenge can become a learning opportunity also as the students learn to counter technical difficulties that may arise.

Mobile devices provide a way for students to harass others. Cyberbullying has been a hot topic in the news in the recent years and can easily be done using a cell phone. “Cyberbullying is sending or posting harmful or cruel text or images using the Internet or other digital communication devices” (Willard, 2004, p. 1). Many different types of cyberbullying can affect students and their learning. Text messaging, video, and images are the main types of bullying done with a cell phone. The video and images can be posted on social networking sites to embarrass or harass students and teachers. To combat cyberbullying, the topic should be addressed in the classroom. Teachers and administrators need to bring attention to cyberbullying and ways to prevent and combat it. According to Willard (2004), to help empower students to become bystanders-who-are-part-of-the-solution, it would be helpful for schools to do the following:

- Emphasize the importance of speaking out against bullies, or, if this is not safe under the circumstances, reporting such actions to a responsible adult.
- Discuss effective cyberbullying intervention strategies with students so they are empowered to provide assistance to others.

- Establish an anonymous reporting box where students can place downloaded material or information that demonstrates concerns.
- Establish a student court to address issues of face-to-face bullying and cyberbullying incidents that occur in school. Students are far more likely to be receptive to thought of their peers on this issue than the thoughts of adults.
- Ask your students for other suggestions. As this is the student online world, it will be important to listen to these suggestions.

There are many concerns with cyberbullying and its effects on youth. Cyberbullying can lead to assault, infliction of pain onto oneself, or worse, suicide. Students need to understand the implications of cyberbullying and educators can address this in the classroom to help them understand the severity of the problem.

Sending permission letters home to parents can be an effective way to inform the parent(s) of how the mobile devices will be used within the current curriculum. The letter will need to be approved by the building principal and superintendent before any action takes place. Here are some points to cover in the permission letter (Kolb, 2008):

1. Anticipation for the assignment on behalf of the teacher and students
2. Support from building principal and/or superintendent
3. Educational goals that will be reached by using the mobile device
4. Intentions to teach cell phone etiquette, safety, and publishing online
5. Alternative options for students without access to mobile devices
6. Consequences for misusing the device or any Web 2.0 websites
7. Parental participation options
8. Links to web sites that will be used along with the mobile device and

access options for parents

9. Privacy of students when using the various websites for the project.

Ensuring the parent(s) that protecting the identity of students is important and what is posted will be information that is content-based and not personal

10. Contact information for questions, concerns, and suggestions.

Educators should go through the challenges that may arise while using mobile devices before actually implementing them into the curriculum. Being prepared for the problems that may arise will help the transition go smoother. Teachers also need to take control of the classroom environment. Determining when and where the mobile devices can be used in the classroom is up to the teacher. Teachers can collect the cell phones as the students enter the learning environment and then hand them out when he/she is ready to use them with the curriculum (Kolb, 2008). Laying out a definite structure and strict policies as to how the devices are used will help combat the challenges that can occur.

With any new technology that is incorporated into the classroom comes challenges along with it. Students need to be taught the correct way to use the technology and proper etiquette. After teaching students these things, incorporating mobile devices into the classroom may not be so challenging.

CONCLUSIONS AND RECOMMENDATIONS

In today's world, students are more likely to be carrying a cell phone than having a computer at home. Students have a virtual laptop in the palms of their hands. Many students do carry a mobile device with them at all times and the author believes this number will continue to rise. Mobile devices can be an educational tool if educators change the way they view these devices.

Mobile devices have assumed the function of a laptop. The idea of convergence is important to consider when implementing the new technology. With students carrying the highly functional mobile devices in their pockets, it can be looked at as a one to one laptop system where some day every student is likely to have access to a mobile device. Students can use the mobile device in lieu of a laptop.

Outside of the school day, students are thoroughly engaged in their 21st century lives (Prensky, 2005/2006). Overall, the author believes that mobile devices can add to the motivation, engagement and quality of some of the assignments done in the classroom. Teachers need to teach students how to use mobile devices in the classroom and what is appropriate and what is not. These types of life skills are very important for the digital students in today's classroom. Not only will this help combat the challenges that mobile devices can bring to the classroom, but also it will help the students become good digital citizens.

Experience using cell phones in education is fairly new. Teachers will need to conduct further research of other capabilities and enhancements that mobile devices can bring to the classroom. There may also be other challenges that may arise that need to be addressed before the incorporation of mobile devices. It is imperative that the teacher

communicates with the parents to ensure proper usage in the classroom. Students need to understand their cell phone contracts also. This is an imperative life skill for students and will help the families also.

Mobile devices do not have to be in the classroom to be effective. Students can use the cell phones to capture images, voice recordings, video and other data outside of school and upload the information to the Internet. When the students return to the classroom, the data collected can be retrieved using the Internet to be shared with the teacher and other students.

In conclusion, teachers need to embrace technology changes as they occur. “Our students are so different from us that we can no longer use either our 20th century knowledge or our training as a guide to what is best for them educationally” (Prensky, 2005/2006, p. 9). Mobile devices have the ability to enhance current curriculum and the education of students. The motivation and engagement that mobile devices can bring to the classroom will help the digital students become more engaged in their studies. As with all technology, challenges will arise. As educators, teaching the students how to use the mobile device within the constraints of education is an important part of educating our students. Outlining the rules and expectations of the use in the classroom will also help eliminate problems that teachers can encounter. Mobile devices can add to the variety and motivation of a classroom.

As mobile devices change, further research will need to be done to ensure that the device is helping to reach the learning goals set forth in the classroom. There is also a need to research open-access and school filtering systems as mobile devices can bypass the filter. Cost is another area that needs to be addressed. Research on the topic of mobile

devices usage in the classroom is continually being updated. More and more classrooms are beginning to implement programs that use mobile devices for the benefit of the student and his/her learning.

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