STUDENTS USING THEIR OWN TECHNOLOGY DEVICE IN THE CLASSROOM: CAN “BYOD” INCREASE MOTIVATION AND LEARNING

by

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Abstract

This research study will review current research pertaining to the success of school systems utilizing Bring Your Own Device (BYOD) programs. Common sense tells educators technology use in the classroom enhances and improves student learning. School systems and teachers are being held accountable for student success and improvement. Studies show a majority of teenage students own, or have access to: smart phones, iPads and other technologies enabling them to access the Internet and other wireless communication. Teachers who utilize this type of technology in their classrooms may have a better chance of improving student learning in their classrooms. This review of research will investigate the utilization of BYOD technologies in the classroom to determine if more learning opportunities and student motivation increases with implementing BYOD programs.
CHAPTER I

INTRODUCTION

Creating and implementing educational change entails a great degree of complexity and uncertainty. How to implement and guide educational change in schools has been an ongoing question. Over the past few decades, research indicated the role of the principal played a major part in educational change. Later, research presented a more democratic approach; this approach invited all professionals on the school staff into inclusive leadership. This focus on school change, which focused on teacher improvement, was seen as beneficial to student learning. Still another philosophical shift has gathered momentum with regard to the professional development of teachers. This reform moves professional development beyond supporting teachers with new knowledge or skills, and involves teachers and administrators in their dual roles of both teaching and learning. School staffs operating this way became known as professional learning communities (SEDL, 1997).

Throughout the years many educational reforms have been implemented. Some have been successful while others have not. Professional learning communities became one of the most talked about ideas in education (Thompson, 2004). Many schools are working to become professional learning communities to improve student learning. The philosophy of a professional learning community defined by Thompson (2004), “When adults commit themselves to talking collaboratively about teaching and learning, and then take these actions into the classroom, student learning and achievement improve.” Although administrators and teachers’ perceptions about the value of professional learning communities are important, the main issue was whether or not this type of school reform helped student motivation and learning. The latest shift in
educational reform represents a focus on mobile technology use in the classroom and teachers using social media as a means of communicating with students outside of the classroom.

**Statement of Problem**

With a focus on student learning and student success, the purpose of this paper is to provide a review of the research available on the impact of the use of mobile technologies and social media. Should “smart phone” technologies or bring your own device (BYOD) programs be implemented in classrooms to improve student learning? Common sense tells educators technology use in the classroom enhances and improves student learning. Since the implementation of “No Child Left Behind,” teachers are required to improve student learning, and some schools are looking into these BYOD programs to improve student performance in the classroom. The initial results are positive in classrooms utilizing these technologies to improve student success and motivation to learn. This research study will review current research pertaining to the success of school systems that have utilized BYOD programs and will also review the positive and negative implications with instituting such programs in a school system.

The importance of researching the use of smart phones and BYOD programs is to explore ways to improve student learning in the classroom. It has been shown that students learn in a much different way than in previous years. Studies also show us a majority of teenage students own, or have access to: smart phones, iPads and other technologies that enable them to access the Internet and other wireless communications. Teachers who utilize this type of technology in their classrooms may have a better chance of improving student learning in their classrooms, and may also gain access to resources not available to teachers who don’t use this type of teaching strategy.
Using smart phone technologies and BYOD devices in the classroom to enhance student learning may open up avenues and revenues for the classroom. Companies such as Apple, Verizon etc. may offer grants and other funding for the implementation of smart phone technologies in the classroom. Research shows the importance of technology use in the classroom. According to NetDay, a national nonprofit group, in 2009, 70% of students in grades six through twelve used a cell phone either during school or in their free time, while 67% of 9th-12th graders having a cell phone and 31% have smart phones (Project Tomorrow, 2009). Utilizing smart phone technologies, which a majority of students already own, may open up learning opportunities for more of our students to help them become successful in the classroom. Merit pay programs and teacher tenure are being tied to the improvement of student learning, thus teachers must look at all of the options and opportunities available to them to ensure student success.

The specific areas for review of research will investigate how current students best learn, what teaching strategies work best and how technology plays a part in student learning. Literature will be reviewed for the purpose of researching the effects of technology in younger students as well as older students.

In reviewing the literature available for schools, which have implemented BYOD technologies in the classroom to improve student learning, a comparison is made of student achievement before the implementation of these programs to student achievement after the implementation of BYOD programs. A review of literature will also show some of the negatives or difficulties associated with the implementation of BYOD programs.
Research Question

1. Does the use of mobile learning technologies (smart phones, touch screen tablets) motivate students to learn in the classroom?

2. Does the use of mobile technologies in the classroom enhance the learning experience in the classroom?

3. Does the use of mobile technologies improve student learning in the classroom?

Definition of Terms

1. Smart Phone: any mobile communication device capable of accessing the Internet

2. Touch screen mobile communication technology: a mobile device that can access the Internet (i.e. iPad, Kindle, iPod touch)

3. Mobile Learning: use of mobile or wireless devices for the purpose of learning while on the move or learning that takes advantage of mobile technologies

4. Learning Community: the collaboration among teachers and or students in education

5. Social Media: a group of Internet-based applications that build on the ideological and technological foundations of Web 2.0, and that allow the creation and exchange of user-generated content (Kaplan & Haenlein, 2010).

6. BYOD: (Bring Your Own Device): trend of using iPads, iPhones, Android phones, and sometimes even their own laptops, and expecting to use these to gain access to corporate (educational) data (Miller, 2012).
Chapter II: Review of Literature

If this research review had been done ten years ago, the research pertaining to mobile technology use in the classroom would have been scarce at best. Electronic media use in the classroom was implemented almost a century ago with technologies such as film and radio. Instructional video, audio and videocassettes became available in the 1960s. With the advent of the microcomputer in the 1980s, computer assisted learning became commonplace in the classroom. The emergence of the Internet in the 1990s created new methods for distributing learning content to students, thus enhancing the flexibility for learning inside and outside of the classroom known as e-learning (Westera, 2012). New touch screen mobile technologies with Internet access have created a shift from the Professional Learning Community within a school system to various types of socio-technical innovations for learning practices. Internet services like YouTube, Facebook and MySpace set the standards for quality, speed and flexibility of services that are pursued by educational institutions (Westera). New media technologies such as smart phones and iPads permeate our daily lives. Technology enhanced learning, combined with social media for educational purposes, will be important for today’s students to enhance knowledge, creativity, collaboration and innovation in the classroom and to take these skills when they join the workforce.

In an article by Norris and Soloway (2010), they observed children today spending much of their time outside of school using mobile technologies; yet in American classrooms, we ban those mobile technologies in favor of using 18th-century pencil and paper. We claim to be teaching 21st-century skills but are using 18th-century tools. The following review of current literature in the area of students bringing their own device (BYOD) into the classroom has been
broken up into the following categories: current student uses of mobile technology in and out of the classroom; how mobile technology influences students attitudes, behavior and achievement; risks and issues to consider for using mobile technologies in education; and linking mobile technology use in the classroom to improved student learning and comprehension. The research, although initially positive, does not conclusively show long-term positive effects that mobile technology use in the classroom improves student learning.

**Current Student Use of Mobile Technology in and out of the Classroom**

McNeill, Diao and Gosper conducted a study (2011) to explore how students use technology in their everyday lives, whether usage is on or off campus, to support their learning. The study uses terms such as “Digital Natives” and “Net Generation” to describe the new group of students coming into universities. These students are fundamentally different than educators have seen before. Their study states the Net Generation “have spent their lives surrounded by and using computers, videogames, digital music players, video cams, cell phones, and all the other toys and tools of the digital age.”

The participants in the study were university students in Australia. In depth interviews were used as a qualitative technique to capture data about how students used technologies in their learning. Data suggests “that this generation of students prefer receiving information rapidly, have a low tolerance for lectures, prefer active rather than passive learning and rely heavily on communication technologies to access information.” This article does question the evidence for the impact on the quality of learning using educational technologies and reminds us that while the tools may change the processes used for student learning have not. It is also stated
some U.S. studies indicated most students have a high level of usage for social networking tools; their use for educational purposes is limited in many instances. This study was designed to identify issues for further exploration on how students use technologies in their learning whether on or off campus. According to Gedik, Hanci-Karademirci, Dursin, and Cagiltay (2012) in a study aimed to reveal critical issues in designing mobile learning programs 90% of the world population has available access to mobile networks “using mobile technologies in learning environments can offer diverse opportunities for educators and learners” (International Telecommunication Union, 2010).

A three part study by Kim and Turner (2009) set out to study how note taking takes place in the classroom and to identify how electronic note taking systems can support this activity. Thirty-five computer science graduate students and human-computer interaction researchers were surveyed and participation was voluntary. All of the surveys took place at a large four-year university. The first part of the study was an online survey of students to ascertain their current practices, and their opinions, on how note taking is done in the classroom. The survey also asked their attitudes towards electronic note-taking systems. The second part was an observation of students’ behavior in a classroom lecture followed by a short quiz. The third was an analysis of the notes taken by a few students on a Tablet PC for their classes. A small part of the study looked at the effects of different devices on the process of note taking that compared Tablet PCs and PDAs against paper and pen. One result from the PDA condition showed that there were more errors using a PDA than in the paper and pen condition.

The conclusion of the study suggests that note taking may be best supported with paper and pen, but in some instances electronic form may be better. The results suggest that using electronic devices support the note-taking task, but hardware limitations such as screen size, add
to the difficulties of using these technologies for improved student learning. If using electronic devices makes the note-taking task harder, we have made taking notes more difficult; however, if using technology for note taking evolves to a more practical application, the benefits seem to be worth it.

Students of today categorize themselves as highly technologically literate. Students in the study reported always carrying a mobile phone and a USB drive with them. The research is significant in that it explores how and where the students use this mobile technology. Students are looking to use the latest technologies, and the survey in this article strongly indicates students are seeking to use technologies that provide access, efficiency and connectedness. In an article by Bestwick and Campbell (2010), they ask the question: “What is the best way to teach the technologically savvy children of today?” One-way people learn best is through interacting with others to build knowledge. Smart phones and iPads (mobile technologies) allow students and teachers to collaborate through Internet access; 3G and 4G networks via social media sustain both physical and social interactions. The need for training for both staff and students is another cause for concern in a rapidly changing technological environment. Strategies for encouraging and supporting staff in implementing technologies to enhance their teaching and student learning are critical to the success of using mobile technologies in the classroom.

**Social Networking Sites as Learning Environments**

Swan, van’t Hooft, Kratcoski and Unger are researchers and college professors whose research specializes in computer-assisted technology. Their study (2005) had a focus on the use of handheld technologies in K-12 teacher education. The research relates to other work in the
field by researching how the increase in motivation by students who use mobile devices may lead to the increase in quality and quantity of student work.

The use of mobile technologies is an integral part of the current generation of K-12 learners. Swan (2012) states, “even though many students use these technologies as integral parts of their lives, they learned to do so mostly outside of school and teachers are struggling to integrate technology into their curriculum.” Technology usage in the classroom is not going away, but more systematic research to investigate the effects of these handheld technologies for student learning may help teachers integrate technology into their curriculum.

Early evaluations of this study indicate a favorable student response to handheld devices. This study suggests that handheld devices have the potential to positively affect student learning across the curriculum. The preliminary study was designed to begin exploring the use of mobile handheld devices and its effects on student learning. These three questions were addressed:

1. How do students use mobile computing devices?
2. Does the use of mobile computing devices affect students’ motivation to learn and engagement in learning?
3. Does students’ use of mobile computing devices support learning processes?

Participants in the study were from two different school sites in northeast Ohio, and included 3rd, 6th and 7th grade students. Students were given handheld mobile computing devices to use and take home for a six-week period. Because of their small size, mobile handheld devices support student learning outside the classroom giving them the potential to support life-long learning anytime, anywhere.

Although this particular research is over five years old, it is timely and worthwhile. The study provided some indication that the use of handheld technologies can enhance the student
learning process. The study also indicates that the use of mobile handheld technologies may increase student motivation to learn and increase their engagement in learning activities. Veletsianos and Navarrete (2012) presented a case study of learners’ perspectives and experiences in an online course that indicated, “Students enjoyed and appreciated both the social learning experience afforded by the online social network.” Social networking sites have the potential to facilitate interaction, communication and collaboration for students when the technology is used to support their education.

Some limitations of the studies were that the use of mobile handheld technologies was only for a short amount of time. The research studies lasted for a semester at most (usually one lesson), and the researchers did state a “novelty” affect with high motivation at the beginning of the study that lessened as the study went on. Technology use in the classroom can also result in equipment problems with the building network that may constrain the use of the mobile handheld devices, as well as classroom logistics, technical support, etc. The authors don’t necessarily provide fresh insight to educational technology, but they do reiterate some important points pertaining to equity and appropriate use of the technology. Choosing the appropriate technology tool for a specific task is always changing as technology changes. Teachers must realize that just implementing technology into the classroom won’t improve student learning itself, teachers must use the technology appropriately to improve and enhance student learning.

**Influences of Mobile Technologies on Students’ Attitude, Behavior and Achievement**

An empirical study by Rau, Gao and Wu (2008) considered motivation and pressure as two factors that impact vocational senior high school student learning. They observed the impact
of using individual communication technologies on student learning motivation, pressure and performance based on comparative investigation of 176 vocational high school students in Taiwan. Vocational high school students in Taiwan are reported as less motivated and lacking confidence due to excessive academic frustrations and greater social pressures. To elevate student motivation and promote efficiency in instruction, more and more computer technologies are integrated into classrooms with emerging mobile communications in the area of education.

The objective of the study is to investigate the effects of mobile communication technology in education, with a focus on instant messaging usage. Two experiments were conducted in Tao-Yuan vocational senior high school and focused on the following two questions: 1) What is the impact of different communication media (such as email, instant messaging, and electronic online forum) on learning motivation, student pressure and learning performance when each functions individually? And, 2) How can learning motivation, pressure and performance be influenced when mobile and Internet communication are used synergistically? Previous studies have found that motivation (intrinsic and extrinsic) of students have significant impact on their learning performance. The first experiment aimed to study the impacts of individual electronic communication media on student motivation, pressure, and performance when these media are used to assist interaction between student and instructor. Experiment two examined the effects of various combinations of mobile and Internet communication tools on the learning process.

A positive classroom environment is critical for fostering motivation in students, and some researchers concluded that a learner-centered environment yielded better performance. Peer coaching and learning communities are typical applications to create a positive learning environment. This study was limited, because three to four weeks did not significantly reveal
changes in exam performance. The empirical data and findings did suggest that mobile communication technologies can help bond the instructor and students without increasing pressure on the students and implies that students may be more motivated by the bonding that occurs between student and instructor than by other factors.

Hwang and Chang conducted a similar study (2011) that proposed a formative assessment-based approach to mobile learning. The participants in their study were two classes of fifth grade students at an elementary school in Tainin City. Pre and post-tests were developed, and it was concluded that the two groups did not differ significantly before learning the subject unit. After participating in the learning activity, the experimental group had significant improvements in both their learning interest and their learning attitude. Hwang and Chang’s findings revealed the possibility that many computer-assisted learning strategies with the use of mobile technologies have the potential for enhancing the learning achievements of students.

**Linking Mobile Technology Use to Improve Student Learning**

This evaluative-exploratory case study by Menkhoff and Bengtsson (2012) reports in an evaluative-exploratory case study on pedagogical experiences using mobile phones, wikis, and other mobile learning in an undergraduate course on Chinese Entrepreneurship and Asian Business Networks taught at a university in Singapore. Using these technologies can greatly enrich learners’ experience and produce positive learning outcomes when blended with traditional instruction.

Past research on technology in education has mainly focused on the classroom as a place of learning; mobile technologies allow students to get connected and to manage their work more
effectively outside of the classroom. Using mobile learning devices empowers students to utilize different pathways to build up their own knowledge, and help students to explore and investigate real physical environments. The study followed the tradition of interpretative case study and exploratory research based on the analysis of relevant literature, discussions with participants, colleagues and mobile learning experts as well as student observations during mobile learning activities.

Although no new or fresh insight to the use of mobile technologies was given in this research article, the study does suggest that a teaching method, which puts an emphasis on mobile learning technologies in a blended context, clearly helps to promote student learning. Utilizing these approaches enable students to engage in meaningful, collaborative learning. Mobile learning devices bring excitement into the classroom and help to empower students. They have an appeal to students because mobile technology represents everyday communication in which they are familiar with and applies that communication to their learning and comprehension.

Rinehart (2012) conducted a study for his thesis to explore the effects on learning content from students using their own smart phones in and out of the classroom. This combination quantitative and qualitative study was conducted at a high-performing school in southern California. The study was designed to explore the educational potential of mobile phones in classrooms.

The students in the study were mostly ninth graders enrolled in a high school biology class. Most participants in the study were Caucasian from affluent families, but some of the participants were of Asian descent, Latino, or African American ethnicities. Four classes of freshmen level biology students participated in this study. This study was conducted because the
last few years has seen remarkable growth in the area of mobile phone use in the classroom, but substantive research is still new and lacks information that gives educators useful answers. This study seeks to add something meaningful to the gap in usefulness of mobile technology in education research. The qualitative portion of the study gathered observational and descriptive data on participants using visual and audio recordings during the lessons. To test if the mobile phones made a significant difference in test scores, the quantitative portions used independent samples; two-tailed $t$ tests were administered on collected post-test data. The mean of the test scores were compared between each treatment and control group once for each two-week treatment of the study.

As stated earlier in this review, because of the recent remarkable growth in handheld technologies, not a lot of research is available to determine if handheld technologies (including smart phones) can improve student learning. Figuring out how to use these technologies to improve student learning should be given consideration. This study indicates that a reduction in enthusiasm by the students was apparent as the study went on, but requested that future studies focus on various new items and techniques to be utilized in the classroom to combat this. Rinehart concluded that the study only scratched the surface of what these smart phones can do. He reported that the students felt that smart phones helped their learning which was good enough to conclude that these technologies should continue to be used to enhance student learning.
CHAPTER III: RESULTS AND ANALYSIS RELATIVE TO THE PROBLEM

Results and Analysis Relative to the Problem

The evolution of mobile devices has changed the way of learning and teaching. Ahmed (2012) writes that today’s students rely on the technology around them and that most students are “inventing ways to use these devices to learn what they want to learn and how they want to learn (p. 1554). In each of the literature reviews, no mention was made of student’s inability to use the touch screen mobile technologies at any of the grade levels in their research studies. Almost everyone in education today will tell you technology is a powerful tool and most districts are trying to figure out ways to incorporate new and innovative technology into their districts and classrooms to improve student learning.

Each of the studies in the review of literature showed a positive influence in engaging students, increasing their motivation to learn and improving content learning when students were able to use mobile technologies or touch screen mobile technologies. A concern is the appropriate use of the technologies and teacher preparation and comfort with implementing the use of mobile touch screen technologies in their instruction. The issue is not with the students, for they demonstrated enthusiasm and attentiveness when introduced to these technologies, but with the educator’s willingness to tailor education to their students.
CHAPTER IV: RECOMMENDATIONS AND CONCLUSIONS

Recommendations

Sometimes it is much easier to go with the status quo. Schools have offered a fixed technology menu of laptops in a computer lab or a designated technology area in a classroom. Mobile touch screen technologies are not likely to go away and educators should look for ways to use these technologies in their classrooms. According to an article by MacGibbon (2012), “schools that have adopted bring your own technology are experiencing better outcomes from a more personalized education and enhanced engagement between home and school. But words such as equity and access keep coming up.” This doesn’t mean that BYOD programs should not be looked into.

One district in California felt it needed to act on a true digital learning revolution. McPhail and Paredes (2011) concluded that this district was able to move forward and change the focus on “outcomes” rather than “inputs.” The devices that student’s use can range from Android slates, iPods, Netbooks, iPads, laptops, iPhones etc., but the constant that remains is the students can use this mobile technology to empower student learning 24/7. The district identified six important points it needed to address before implementing a BYOD program in its school, and they are certainly valid recommendations that I would have as well:

1. Identify specific instructional goals

2. Identify funding possibilities (grants, public/private collaboration, vendor-provided materials and resources, categorical funding resources)
3. Survey parents and students to identify what they have or would be willing to purchase and use that technology to expand what can be done for those who do not have access

4. Identify the digital device that will be available to students to be checked out

5. Provide student and parent orientations

6. Empower students by allowing them complete access to devices provided, but also express expectations for student learning

Certainly what has not been included in the literature reviews is the ability of the school facilities is the ability of the infrastructure to accommodate Internet use. A school’s wireless network would need to be sufficient to support multiple classes of students using mobile touch screen technologies. A majority of students have a mobile touch screen technology device or smart phone technology or both. It would seem logical to look into ways to use these technologies to enhance student learning, but it is the teacher who would need to implement and be comfortable with this technology use in the classroom. It is recommended to survey teachers in a district to see if they would be willing to implement a program such as BYOD in their classrooms. We need to make sure that we have teachers who can use the technology as a powerful tool that fosters collaboration and creativity.

**Areas for Further Research**

Current research of student use of mobile devices in schools is relatively new. Kiger, Herro and Prunty (2012) stated many schools are incorporating mobile touch screen technologies (e.g., iPad, iPod) in learning activities because of its versatility, familiarity with students and
affordability. Further research should take these technologies and implement them in the classroom to investigate their impact on student learning. One of the limitations of the research was the finite amount of time that was used for the research program. Most all of the researchers stated that there was initial excitement that faded away towards the end of the program. Further research should provide for a longer amount of time, perhaps the entire school year, to study a BYOD program to determine if the novelty will wear off on students.

For further research, I would recommend using multiple students, from multiple grades. Quantitative data collected from each student would be their previous grades from their previous school years. From my experience in education for the past ten years, student’s grades generally stay the same from year to year for each subject. For instance, a student who received a “B” in my social studies class in 6th grade will probably receive a “B” in my 8th grade social studies class. If a researcher wanted to create a pre and post-test after a unit to determine if a “control” group performed better on the post-test that would be the standard procedure, but again it only provides data for that particular unit. The research should be over the entire year, which would require significant preparation from the classroom teacher. Conducting interviews with students to determine if they found it beneficial to their learning by using their own mobile touch screen technologies would collect qualitative data. Questions that could be considered for students to help determine if BYOD implementation would improve their motivation to learn:

1. What are your thoughts about using mobile touch screen technologies for classroom related assignments?
2. Do you think mobile touch screen technologies are a distraction in the classroom?

   Explain.
3. Do you think the mobile touch screen technologies helped you to learn better in the classroom? Explain.

4. Did you use your mobile touch screen technology for educational use outside of the classroom? If so, how and for what purpose?

5. Did using mobile touch screen technology make classroom instruction more fun and helpful? If so, how? If not, why not?

Analysis of the data should combine the student’s perceptions of mobile touch screen technology use in the classroom with the comparison of previous grades before implementing BYOD for classroom instruction. Students learn differently today than previous generations. If implementing BYOD programs in the classroom presents positive behaviors to learning and does not show a decline from previous grades, then the research should be considered successful.

**Summary and Conclusion**

It is clear that technology is evolving at a rapid pace. Students today are adept at using mobile touch screen technologies such as iPads and smartphones, and social media such as Facebook, Twitter, MySpace, etc. Educators are looking to incorporate these technologies and social media in the classroom to improve student motivation and learning. Because of the rapid evolution of technology, current research is limited and can become outdated in a few short years as the technology changes. What is not changing is the students widespread use of these technologies and the use of social media on a daily basis outside of school.

Research has suggested that implementing technology to enhance and improve student learning creates a positive learning atmosphere for most students. Implementing bring your own device (BYOD) programs in school districts may be one way for educators to improve student
engagement, to interact with peers, to improve communication and to extend the place and time of learning, not restricting learning to the classroom. Certainly cost can be a major factor in implementing BYOD programs. Equity is another issue to consider. Districts would need to provide some of the technologies (iPads etc.) for those students who do not have such technologies and promote sharing among students in group work if technologies are not available to all students. Schools would also need to update their wireless infrastructure to accommodate wireless technologies. Teachers would need the right attitude and training to implement BYOD programs in the classroom and adjust their instruction and lessons to promote mobile learning.

In my opinion, any strategy or technology introduced in the classroom that improves student motivation and learning should be seriously considered for implementation. Each literature review stated positive perceptions by students when technologies were introduced in the classroom. Today’s younger generation is using mobile technologies on a regular basis, and these technologies should be explored for classroom use to enhance student learning whenever possible.
References


Appendix