

## BRING YOUR OWN DEVICE ACTION RESEARCH REPORT



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January 2013

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# Bring Your Own Device!

*A two month action research!*

## Overview Of The Research

In collaboration with the Department of Education and Tantramar Regional High School (TRHS), Anglophone School District - East has conducted action research to determine the impact of the “Bring Your Own Device” (BYOD) project at TRHS.

The purpose of this research study is twofold: to have a better understanding of the efficiency of the personal mobile device as an instructional tool and to develop a systematic process to allow schools to incorporate a BYOD program safely, as part of the school culture.

Tantramar Regional High School is located in the small community of Sackville, New Brunswick. This is a rural school with approximately 460 students and 33 teachers. One of the primary reasons for selecting TRHS to conduct this research study is because of the pre-existing network infrastructure in place to support this initiative.

## Introduction

To be globally competitive in the 21<sup>st</sup> century, students need to be critical thinkers and problem solvers with the ability to work and learn in teams while also being innovative, creative, and complex communicators. The use of Information and Communication Technology (ICT) tools certainly can contribute to the development of these skills. Research indicates that the evolution of ICT definitely has changed the way people communicate, collaborate, cooperate and from an education perspective, the ways students can learn. The use of video conferencing to communicate, podcasts and blogs to publish, and collaborative platforms to share resources has established an environment where students can be in control of their learning. ICT has resulted in a shift in the process of learning. Furthermore, it has created some questions about how, when and where students can learn.

With the evolution of the ICT hardware, digital information can now be accessed from a handheld device. In 2008, Anglophone School District - East conducted a two year research study on mobile learning. Data collected from this project indicated that 81% of students in grade 6 to 12 had a cellphone and 36% of these students had a Smart Phone. Therefore it is fair to conclude that the BYOD program is a natural evolution of technology as a learning tool. This notion is building momentum in education systems around the world. Many

school districts are currently researching the potential benefits and the inherent challenges of BYOD at schools.

It is imperative to attain a solid understanding of the the impact of BYOD. There are two major areas that require closer examination: the classroom learning environment and the network infrastructure.

The first area of concentration is an environment of learning where students can use a personal device anytime and have access to unfiltered information. With the understanding that the devices are not filtered, admittedly it is difficult to monitor specific student activities on the personal devices. Regardless of this obvious challenge the inclusion of these devices in the classroom offers increased instructional flexibility to teachers, provides students more accessibility to electronic academic research information, and creates abundant opportunities for virtual collaboration and communication using ICT tools like the NBED Portal, NBED Blogs, NBED Wikis, NBED e-mail and other electronic sources.

The second focal point is the impact of personal devices on the network infrastructure of schools. In 2003-04, the New Brunswick Department of Education invested a significant amount of resources in the schools' network with the intent of providing internet connectivity to educational staff including school administrators, teachers, psychologists, custodians, and school administrative assistants. This layout is known as a "thin wireless" infrastructure. Only a few Access Points (AP) are installed in specific locations of the school to make sure all school staff have access to the Internet. One of the potential challenges is having multiple devices connected to the school wireless network that overload the wireless connectivity and result in lost connection. The network layout is designed for a limited amount of users; BYOD creates a broader perspective in terms of network infrastructure volume.

As indicated, the focus of the action research study is to achieve a better understanding of the impact of personal mobile devices as an instructional tool and the development of a systematic process to allow schools to incorporate a BYOD program as part of an effective learning culture in schools. The methodology, results, classroom observations, interviews, recommendation, and conclusion are contained in the following sections of this report.

Before pursuing this topic, it would be important to clarify and understand what is an ICT tool. It is basically any device capable of receiving, processing and sending digital information wirelessly or physically connected. These tools can be a notebook, netbook, cell and smart phones, gaming console, iPod, tablet like iPad and Playbook to name a few. All of these devices are part of the technology evolution.

## Methodology

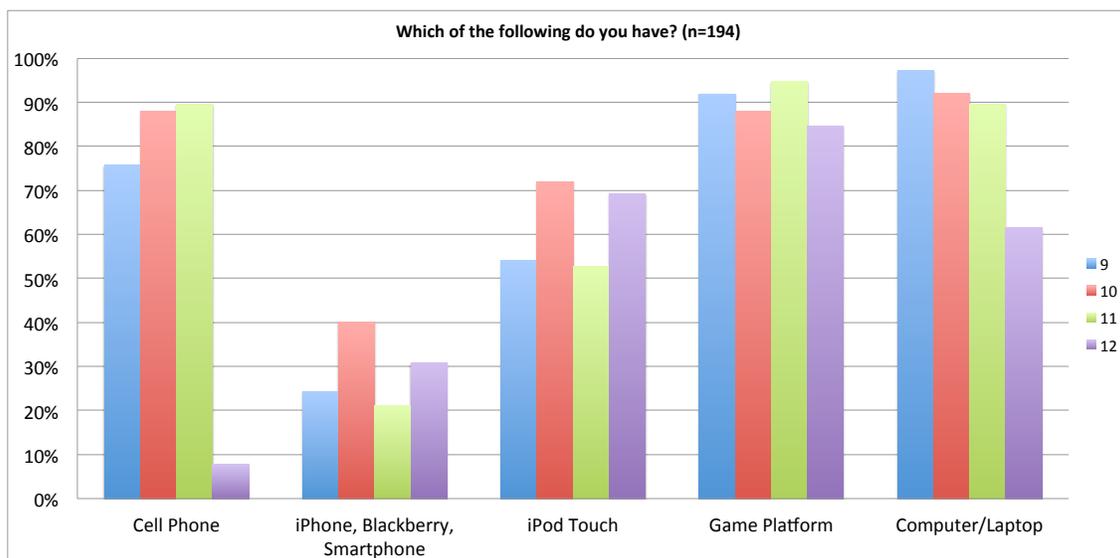
The action research was conducted during a five week period in May and June 2012. A school committee was formed by the school administrator and the district office personal to discuss the layout and scope of the project. In consultation with school staff, four teachers volunteered to participate in the research with their classes. With the four classes, a total of 87 students were involved in the project. A letter was sent home to be signed, indicating that students were able to bring their own devices to school to support their learning. As mentioned previously, those personal devices have the capability of connecting to the school wireless network.

A survey was completed by grade 9 to 12 students to identify what personal mobile devices they possessed. Due to limited time only six hours of classroom observation was done; seven students and three teachers were interviewed. It is important to indicate that none of the teachers received any PD for this project. To provide support to teachers, one technology mentor was assigned full time for the first week and one technician was on standby in case of network connectivity issues.

## Results

Based on the data collected, it is important to mention that a low participation of grade 12 students (n=32) responded to the survey. Therefore, the grade 12 data representation on the following chart is questionable.

A. Chart 1: Student Survey (Student ICT Devices)



As anticipated, the chart indicates that the cell phone and the iPod touch are the handheld devices that are well embedded in students' personal lives. Actually one of the students that was interviewed mentioned that it was exciting to be able to use his iPod touch for academic purposes and not get in trouble for using it. Another student indicated it was effective to use your own device because it was set to your personal need and you could work at maximum efficiency.

As for the smartphone, 29.5% of the student population own one. This is quite remarkable! It means that three students out of ten have a personal device where they can have access to digital information (Internet) to support their learning anytime and anywhere. It would be interesting to know what their predominant activities are with these devices and how teachers could capitalize on these activities as a teaching strategy.

What was quite revealing is that 61.3% of the population have an iPod. An iPod is a handheld device where students could have access to information using the wireless network at school. Currently one of the major challenges that Anglophone East School District is experiencing is the lack of accessibility to ICT equipment and support at school. Knowing that six students out of 10 own a device capable to access information, schools and district should be investing in wireless infrastructure and an equity plan for the students that do not own an ICT device.

It is also fascinating to discover that 89.5% of the students have a gaming platform such as PS2, Playstation, and Wii to name a few that are at the high school level. Having said that, there are many research studies that are in the process of investigating how gaming platform stimulates the process of learning and how those 21 Century learning skills like collaboration, critical thinking and problems solving are developed.

# Classroom Observations and Interviews

## A. Classroom Observation

When students realized that they were able to bring their own device to school, they were excited and considered themselves privileged to have this opportunity. They felt a sense of responsibility about their personal device to support their learning. It was also interesting to observe that students were using and accessing multiple personal devices at the same time in their classes. Some students engaged with as many as three devices; they were using each of them for different tasks.

It was rare that students had technical issues because these devices were their own and if they did, they typically were able to solve the problem themselves or in consultation with a peer. The most common issue was losing wireless connectivity. By logging in again the problem was quickly solved. Interestingly, students were guarded with their handheld devices such as cell phones and Smart Phones (Blackberry and iPhone). They were more receptive to sharing their notebooks (laptop, netbook and Macbook) in a similar manner to sharing paper books.

The most fascinating observation was that students accessed multiple applications to accomplish their work regardless of the software. For example, to create graphs, some students used Lotus 123, some used Numbers, others Microsoft Excel or Google Docs. It was the same with the writing process and media production activities. It would be interesting to find out how many software/licenses purchased by the the province are really needed.

For printing and document storing, students sent their documents to the teacher to have them printed as needed. Students had access to the Virtual Classroom provided by the Department of Education to upload and share documents. Online resources included Google, Wikipedia, and Youtube were the most used by the students. Equally noticeable was that students were able to seamlessly transform their personal devices into a learning tool.

At the beginning of each session teachers gave clear expectations and goals of the lesson plan or project. It was evident that the teachers were prepared for and comfortable with students accessing their own devices in their classrooms. From a class management perspective, there was an ongoing sense of mutual respect between teachers and students.

## B. Interviews

### *Students Interviews*

Seven students were interviewed individually for a period of 10 to 15 minutes. It was evident that these students were excited to use their personal device for academic purposes. They were confident in their ability to manipulate their devices which further enabled them to effectively complete the assigned task. Additionally, the fact that they were able to start an activity at school and finish it at home on the same device increased their efficiency with task completion. They didn't have to save work on a memory stick and load it on the home computer.

All students indicated that they had more ownership on their personal device instead of the device provided by the education system. They felt an increased sense of control over their device. The ability to personalize gave them a sense of productivity. Many of them mentioned that it took a certain amount of time for the computer to start up. Every time they used the same computer it automatically reset because of a program call "Deepfreeze". With their devices, they knew where their work was saved. Here is a video link that captures their perspective (<http://www.youtube.com/watch?v=OWzUVdIZ9mI>).

It is evident that students really appreciated and enjoyed using the personal devices at school to accomplish academic activities. One student commented, "It's so cool using my own computer to do my work!"

### *Teachers Interview:*

At first, teachers were intimidated and very nervous that students were bringing their own devices to use them in class. They felt they didn't know what they were doing with the devices. They mentioned that it was important for them to clearly identify student expectations using their devices in class. They also indicated that the support of the Technology Mentor was vital to help the teacher to adapt to this new learning environment.

The biggest challenge for the teacher was to design learning activities where the students were always engaged. Therefore teachers had to find other teaching strategies and resources to assure students were always involved in their learning. Mrs. Ball stated, "If the project is good and the students are engaged, then they use their equipment for the right reason and that is for learning!" In addition, teachers were surprised how quickly and naturally students used their devices to support their learning. Mrs. Ball observed that students were using their devices in ways that they never would have thought. The following video link provides further perspective on this initiative from Mrs. Ball and two of her teaching colleagues. (<http://www.youtube.com/watch?v=YKZHIqRzitU>).

Project Based Learning (PBL) and Challenge Based Learning (CBL) were utilized most in class. It is important to mention that all the teachers involved with the research had many prior PD sessions on PBL and CBL.

In summary, all teachers admitted that they were initially apprehensive to allow students to use their personal devices in class. Ultimately they really enjoyed the experience and they also acknowledged the paradigm shift in the education system which allows students to be in charge of their own learning. Students need to be taught how to use their personal device responsibly at school.

## Recommendations

After five weeks and six hours of classroom observation, seven students and three teachers were interviewed. From this there are five recommendations that are important to consider in order to successfully integrate BYOD:

1. *BYOD School Policies:* It is very important to have policies, expectations, code of conduct and have them signed by students and parents.
2. *School network and electrical infrastructure:* A robust wireless network infrastructure is fundamental to ensure all members of the school community are connected and have access to the internet. A minimum of two access points (AP) is recommended per class. This represents a significant up front cost; however it will ensure the implementation and reliability of Bring Your Own Device (BYOD) initiatives which represents a logical progression for the educational system. As for the electrical needs, schools need to have a few identified locations for charging stations. This means, for many schools an electrical upgrade may be needed.
3. *PD Plan for school administrators and teachers:* The school needs to have a strong systematic BYOD plan in the area of professional development as well as infrastructure in order to safely incorporate BYOD pedagogically. Students being “connected” totally redefines how the process of learning is done in the classroom. Consequently it is extremely important to invest a huge amount of energy and time with teachers on how to incorporate those tools into the classroom pedagogically and with the school administrator to create a BYOD school culture. In addition, schools need to have an ICT team to assure maintainability of their ICT plan.

4. *Technology Mentors:* As indicated above, many teachers are not ready to allow BYOD in their classes. The role of the Technology Mentors are critical to assist all members of the school community. These people are lead teachers who are passionate about BYOD and possess a wealth of pedagogical experience, knowledge and expertise to assist and share with educators. Without these individuals there are no logical reasons to move forward.
5. The level of teacher competency to incorporate BYOD in class is very important. Even though the school network and electrical infrastructure is ready, it doesn't mean that teachers are ready as well. School administrators need to determine if teachers have the ICT knowledge, competencies and confidence to integrate many types of personal mobile devices in class as instructional tools. Therefore as part of their PD plan, teachers need to follow the necessary training sessions with the Technology Mentor to ensure proper integration.

## Conclusion

Five weeks of action research is definitely not enough to make a firm conclusion on the implementation of BYOD program at school. However the project has made us realize that BYOD provided more than just additional ICT equipment to the current ICT resources at school. It actually created a shift in the school culture and predominately in the process of learning! It also generated a better picture of the key elements that need to be focused on in order to take advantage of personal mobile devices to support students and teachers in the process of their learning.

Many technology projects with a focus on mobile learning have been initiated in many countries around the world with the goal of increasing student performances. Very few have been proven successful in that regard. It seems that one of the main reasons why is because they were using technology to drive learning. The truth of the matter is, it is not about the technology! It is about teachers ICT knowledge and more importantly the pedagogy to systematically integrate this as instructional and supporting tools.

Teacher's ICT knowledge is fundamental and essential from a mobile device perspective. This is not negotiable! In fact, the whole education system should have a high level of ICT knowledge expectancies (district and provincial staff). Teachers need to understand how these devices work on a personal level so they can use them to support their teaching strategies and integrate them pedagogically. Web 2.0 tools like Bloggs, Wikis and Twitter are some examples. These tools can be very challenging and at the same time very intimidat-

ing for many teachers. The role of the Technology Mentors are vital to support school administrators and teachers in this process. This will ensure a smooth pedagogical transition which will be explained in the following paragraph.

As mentioned above: “it is not about the technology but about pedagogy”. Once the teacher has a personal understanding of the use of ICT tools, the biggest challenge will be to create a learning environment where students are in charge of their learning and the teacher’s role is redefined as a guide or facilitator.

Students and teachers from TRHS have certainly given us an opportunity to better understand the impact of BYOD and recognize the advantages and challenges associated with using personal handheld devices as part of the learning process. As many other research studies have found, it is exciting to confirm that personal handheld devices have a positive impact on student engagement. With more time allocated to the project it will be interesting to find out how these tools impact their achievements.

We know very little about BYOD. Therefore a huge investment of time in professional development for educational leaders, school administrators and teachers is strongly recommended in order to move forward. It is also important to highlight the importance of network infrastructure needs to support such a program.

BYOD represents a shift in the process of learning. It is clear that the education system needs to find ways to adapt to this. Leadership, courage, and commitment are the key words in order to create a paradigm shift in the process of learning if we want to prepare students to compete globally in this 21<sup>st</sup> century.