**PROGRESS REPORT**

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#### *The world we have created is a product of our thinking.*

#### *It cannot be changed without changing our thinking.*

#### *Albert Einstein*

Introduction

Technology has become an integral part of education on the 21st century millennium. There are many educational technologies nowadays that can metamorphose learning and teaching and make it productive, effective, and meaningful both to students and teachers. Learners nowadays must learn multiple skills together with knowledge since information is already available with the existence of internet.

Wagner (2012) argues that the interest and ability to create new knowledge to solve new problems is the single most important skill that all students must master today. All successful innovators have mastered the ability to learn on their own “in the moment” and then apply that knowledge in new ways. With the help of technology, learning can be engaging and collaborative which help students retain their focus and increase interest in exploring their areas of interests. Wagner considers motivation as the source of all good learning and unpacks it by concluding that intrinsic motivation is fueled by play(experimenting), purpose (wanting to make a difference), and passion (devoting yourself to something you find deeply meaningful).

In current classroom setting, we can easily recognize if technology has been employed and/or embedded, whether it's for classroom instruction, management, teaching strategies, pedagogy, or even in assessments. With these, we are empowering teachers with tools that can transform the learners to excel and develop their innate skills and capabilities. As educators, we are preparing our students to become lifelong learners and to connect with others around the world, making it possible to collaborate and engage into something meaningful that will benefit the whole humankind.

Coherence on Curriculum Outcomes

As teachers, it is very crucial that we do comprehend what we are supposed to deliver in line with the curriculum outcomes we are expected to follow. We need to check what our students needs, what are available resources do we have and needed, and if we need other support from stakeholders to be able to fully execute our job as teachers. The ISTE for teachers and the DOE Nova Scotia Curriculum Framework clearly illustrate and identify what our students need to learn and definitely, technology integration is a part of it.

Looking at the curriculum expectations based from the ISTE’s outcomes, by the end of Grade 12s, students will be expected to demonstrate a clear understanding of technological applications, and consistently apply appropriate technology to solve curriculum problems. Students are also expected to demonstrate an ability to assess the application of technology to solve problems. They have almost similar expected outcomes from the NS DOE.

Here’s some of the Nova Scotia Department of Education ICT outcomes for technology operations and concepts, digital citizenship, productivity, communication, research, innovation, problem solving, and decision making by the end of Grade 12s that I intended to address in looking into educational technology for my Grade 10 Math students:

1. TOC 9.1 operate a wide variety of school media, computer, and other educationally appropriate equipment for learning, communication, and the representation of their learning, independently and safely with teacher supervision
2. DC 9.1 demonstrate understanding of the nature of technology and its impacts on different societies and environments; using technology, in local and global contexts, with due regard for the legal and human rights of others
3. PRO 9.2 explore curriculum concepts under study using specialized software; measuring, sampling and recording equipment; and computer-based simulations, with teacher assistance
4. COM 9.1 use language, in a range of aural, print, media, and electronic forms to explore and express their perceptions, feelings, ideas and attitudes; refine their thinking; and interact, negotiate, and collaborate with others in order to build their understanding
5. PTS 12.5 (relates to PTS 9.6 and RPSD 9.2) create electronic charts, tables and graphs; and design, create, and manipulate spread sheets and databases, as part of the process of collecting, analyzing, and displaying data independently
6. RIPSD 9.1 select appropriate measuring and recording devices and/or software to collect data, discover patterns of change over time, solve problems and make logical decisions based on their investigations; with teacher assistance
7. COM 12.6 (relates to 9.3) assess the value and application of information and communication technology in personal and career-related pursuits

To be able to attend to the curriculum issues, integrating technology in classroom setting as I mentioned earlier is a must. This was the very reason why I explore and discuss further on effective computer software including web browsers and mobile apps that can help improve students’ academic performance and critical thinking skills. With the discovery of new technology and combining with effective technology that has been proven, students will benefit most of it.

What’s does Educational Technology bring?

As I mentioned in the previous section, teachers need to check what resources do they need to prepare and need to be able to deliver the expected curriculum outcomes. When I watched the video from Edutopia on “Introduction to Technology Integration”, it clearly explains how rewarding it is to integrate technology in your teaching instruction. Teachers can integrate technology that will perfectly fit for diverse students such as blended learning, flipped classroom, differentiated instruction and assessments, mobile learning, assistive technology for students with learning disabilities, development and construction of pedagogy that will addresses different ages or abilities/skills, cultivation of students to produce work outcomes with pride and shows responsibility, acknowledgment of rights for digital citizenship, and creation of visual presentations that enable students to understand better, thus, making our students empowered with critical media literacy skills that they needed.

Being a Math teacher, as much as I adhere to basic ways of teaching Math, technology has make it possible for the students to eradicate their fear of learning it and help them to enjoy and keep interested in learning the lessons. It also gives other opportunities to use what they learned from other subject areas and use it in Math or vice-versa. Learning does not happen alone in one course but in reality it involves different aspects of all courses. Cross-curricular activities are easy and possible together with the innovative teaching approaches associated with recent technology. Teachers can easily access files as well as students.

With the result of new and changing technology, I see that it is important to equip a teacher with the right tools not for oneself but to give students better opportunities to learn more and gear themselves with the right knowledge they need for their future endeavours. This is the reason why I created a resource depot that organizes and collects educational technology like effective computer software (including web browsers) and mobile apps that improve students’ academic performance and critical thinking skills that are very helpful for Math teachers. We should treat that technology is needed not just to make things easier but rather make students learn skills at the same time and use the knowledge they learn from us to become powerful and good citizens. It also increases and improve efficiency, opportunity, and among other things that makes learning meaningful and productive.

Digital Development

Change is the only thing that is inevitable. Stephen Wilmarth insists that new technologies combined with social and cultural adaptations fundamentally change our understanding of knowledge, its creation and authority. As educators, we have to examine the effect of these trends and respond to the question, “What does it mean to be educated in the 21st century?” The world in which today’s students will graduate is fundamentally different from the world in which we grew up(Stewart, 2010). The quickening pace of globalization over the past 20 years-driven by profound technological changes, and the accelerating pace of scientific discovery, has produced a whole new world. As we live in this technology era where mostly everything is at the tip of the fingertips, we need to shape the mind of the students with the right technology that are beneficial for them.

Few decades ago, the only available technology is just chalk and board for Math. As far I remember, I was taught in Math by lecture alone and basic graphing visualization which are not enough for learning to understand the complexity of math, especially for higher grades. Years passed by, the nature of Math being abstract is becoming less and it is easier to understand concepts through the use of accurate visualization and available technology such as graphing tools, visual/video presentations, simulations, interactive, computers software and mobile apps.

Over the years it’s very evident that there were many things has changed especially in education and one the catalysts is technology itself. With the new technology, learning Math has become challenging and interesting than before. Interactives arouse students’ interest to keep interested in learning Math and focus on completing task because they can feel the value of Math in different perception. Graphing technology has unleashed areas where some teachers are limited to show and explain. Technology extends more ideas that just of one teacher can do. Students are able to do multi-task and express their understanding in different forms, not just in paper-pencil activities. With the aid of technology, the pedagogy has flourished and become established.

Professional Dialogue

The online discussion I have conducted and joined affirms that it is tangible how technology has aided both learners and teachers regardless wherever they are located. We educators share the same sentiments and are fully aware of what technology can do in our classroom regardless of what courses. The results of the dialogue have been positive and gave me more ideas on what to focus on what to share with fellow Math teachers, especially in teaching Math in an English language environment.

During the online discussion, I have realized that although we have different teaching experiences and geographical background, it seems that we use similar educational technology to aid students’ learning. I have done further research and tried their suggested mobile apps, web browsers, and software. Nicole shared her ideas about Moodle that is guided by social constructionist pedagogy that delivers a powerful set of learner-centric tools and collaborative learning. She also brought up some technical glitches that may happen while using Moodle. Alison on the other hand, talked about using visuals in her class using Smart Notebook, Powerpoint, Google Slides or Drawings, and garage Band. She also shared some challenges in using technology such as Smart Notebook is no longer compatible with Mac after one of their updates, carefulness on selecting Youtube videos because of the ads and content, and some issues with missing students’ submission with Google classroom. Xiaodan, who is from China, also shared technology like WPS (Chinese similar version of Microsoft Office), Kahoot, and Wechat. She also recommended some Chinese-based apps like Youdao, Tuoci, and some Chinese apps for learning English language. Although we have different teaching experiences and geographical background, it seems like we use similar educational technology to aid students’ learning. Overall, the forum went well. I found it all interesting and helpful in class instruction.

In other online discussions I have participated, I have noticed as well that even we don't have the same area of interests, I find out that technology has brought us closer, making our worlds smaller. I learned that technology becomes an integral part in the classroom and education as a whole. It might come with some issues like technical glitches or challenges, yet most of it contributed a lot to students’ better understanding and learning to be critical in choosing which educational technology can be more useful to their daily life. Indeed, it is needed to incorporate technology to prepare students in this 21st century learning and prepare them to be globally-minded citizens.

Summary

After thorough research and online discussion about educational technology, I have extracted important notes and ideas that can help me become an effective teacher and a collaborator in the teaching professional community. Computer software (including web browsers) and mobile apps are beneficial in delivering the course content that improves students’ academic performance and critical thinking skills. All of the findings of these research is fused into a resource depot (<http://www.teachingmathinchina.com/resource-depot.html>) that I created that reflects how technology had shaped the way I teach and how my students learn in this modern era.

Educational technology has become the key ingredient to education’s success, not just in shaping the mind of future generation but also in getting connected with the world. Teachers need to continue to share their ideas on integration of technology on their classroom instruction. Although technology comes with some issues and challenges, we should keep in mind to focus on its use, because it is where students and educators can benefit the most.

In lieu with the further research, I would like to reassert the benefits of using educational technology in Math instruction for teachers are numerous. It includes:

1. Students learn better though accurate visual representations of math concepts from media or video clips if needed, or simulations and interactives.
2. While developing math skills, students will also develop other skills such as critical thinking skills, media literacy, language, computer, responsibility, and others that are very important to develop in this technological era.
3. There are very good apps that make the learning very engaging and interesting for students.
4. Technology extend what human beings are limited to do like store countless data and information; and drawing and visualizing ideas easily with appropriate tools.
5. With the technology available, it is very easy to review materials from your previous lessons.
6. Collecting and sharing artifacts, ideas, lessons, and resource materials among teachers and teachers are easy with the technology around.
7. Saves a lot of time once a technology is mastered.
8. Students become globally competitive and active.
9. Easy access to resource materials and textbooks.
10. Online materials are teachers’ little angels.

Teachers who integrate technology into their class instruction not just make their teaching pedagogy more challenging and effective, but at the same time, they will have the students benefit the most out of it. Innovative teaching practices incorporated with educational technology are evident in teachers who engaged in professional development and learning communities and exercises collaboration, thus making themselves as role models to their students. These practices increase students’ academic performance and at the same time, students acquired many skills that are essential for their future jobs/careers in the 21st century.

I would like also to add in this report that not only did I learn a lot about educational technology but also I have more enthusiasm and confidence than before to share my teaching practices and I’m more than willing to collaborate with fellow teachers. Hopefully, there will be more teachers out there that will continue to work hard, cultivate growth-mindset, and follow their passion in teaching. As what Nelson Mandela quoted “*Education is the most powerful weapon which you can use to change the world*”. We can do it!

References

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Websites

<https://www.edutopia.org/technology-integration>

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