OneNote is an excellent way for staff and colleagues to share and collaborate in schools. In my first blog post, I discussed how OneNote was an invaluable tool as an educator and learner. In this blog post, I will explore how OneNote can be a dynamic, comprehensive and powerful collaborative resource for facility and staff.

Shared OneNote folders with teachers in your department or team are a great way to share lesson plans, ideas, anecdotal notes, resources, and other useful information. For our Grade 10 students, we offer a Canadian History course with myself and a few colleagues leading separate sections of the same course and we use OneNote as a critical way to collaborate, share and provide similar assessments, resources, expectations and experiences for students. We have divided the course into units and then share our resources in an annotated binder. OneNote provides a significant update from a shared folder (i.e. OneDrive, Google Drive etc.) as the layout is clearer and more defined. In the example below, we added instructions, graphics, files, annotations, graphics and I even created a page header to make the pages a little more distinctive for the course. In addition, we also use the OneNote Class Notebook Add In (more about this below) with students and I can simply cut and paste the page and/or resources for my students into their OneNote binders saving much time and energy for all.
What is the OneNote Class Notebook Add On?

As a staff we use the OneNote Class Notebook Add In to create a collaborative binder for our staff. In this binder, we share resources, professional learning documents, minutes for our meetings, notes for our weekly messages to our mentees (a group of students assigned to us.) and their parents. Our administration team creates and distributes a class notebook to each member of the facility. Here are the sections.

Each part of this Notebook has specific levels of permissions to aid collaboration. The Content Library is a section for reading and is good for our staff handbook with established policies. Only the creator of the notebook, in this case our administration can edit this section and add content. Below is a good example of a Read-Only document that outlines the Land Acknowledgement that we use in public events to honour the Indigenous Peoples, our settler past and as part of the Truth and Reconciliation Commission. This excellent page and documents are for our use and editing options are not necessary or appropriate as this document was carefully crafted.
The second section is the **Collaboration Space** where all facility can read and edit pages and content. If the text is bold means that new information has been added. (It is always bold, thankfully.) It is important that these pages remain dynamic as all of us contribute with the most up to date information. This year we used OneNote to collaborate on our weekly messages to parents and had many meaningful discussions on pedagogies and student life.

All and all OneNote is an unique and powerful resource for us to help our students learn and help us run our school and organization effectively. We are always looking to improve and would love to hear suggestions and ideas about other good practices and routines using OneNote as a staff.

To learn more: here is a [link about using OneNote as a staff dynamic notebook](http://ict4kids.ca).

Here is a [link to Andrew Howard from Sandymoor School in the United Kingdom on how his team uses OneNote](http://ict4kids.ca).

Here is a link to [Part 1 on OneNote as my ultimate curation tool](http://ict4kids.ca). Part 3 (upcoming) focuses specifically on students and how OneNote can be used as a tool to promote creativity, design and innovation in the classroom.

Thanks for reading.
Badging can be a powerful pedagogical tool for learning and assessment in the classroom. My Communication Technology courses for Grade 10 to 12 students seemed to be a good fit as students developed their skills using Adobe and other creative digital tools. I must confess to always feeling slightly uneasy giving numerical grades on student work and creativity despite rubrics, checklists and anecdotal notes. Perhaps badging provides an additional "alternative" tool that seems more in line with encouraging play, risk-taking and perhaps true innovation. As students completed activities, they received badges (usually up to three per unit) to indicate their progress along with a completed rubric, feedback and the numerical mark or level. However, usually I issued them at strategic moments in the course. One strategy I employed was to issue a badge promptly on a specific due date. This gave me the opportunity to positively highlight a student's hard work and progress at a specific milestone. In a one to one conversation, I also offered them a physical badge and encouragement for their progress. (Almost 100% accepted them and almost all stuck them on their tablet.) Implicit in this teaching moment is a subtle message to who have yet to submit their work and have not yet earned their badge. Many students yet to submit then approached me with a timetable to complete and I could then offer help and support if and when needed. In short, badging shifted the conversation to be more proactive and positive as students are recognized for meeting the deadline and expectations rather than gaining attention in class settings for missing a deadline or check-in.

Both research and practice find that using the badge as a motivator is problematic as it is appealing to some students and could actually have the opposite effect as the worth of the badge is dismissed. Therefore, I explained that the badge was simply an indicator of their progress for themselves and perhaps for their
peers. My practice was to offer the badge positively when students completed a particular or milestone. I would focus my conversation on their work, progress and creativity rather using the badge as a motivator.

Physical or Digital badging? (Both?)

Both.

I decided to use OneNote and particularly the OneNote Class Notebook as a place shared only between the student and myself for students to collect and share their virtual/digital badges.

<table>
<thead>
<tr>
<th>Badge Title</th>
<th>Criteria</th>
<th>Earned</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learning Profile</td>
<td>Completed the Learning Styles survey and recognized my learning profile (giving your learning profile into your portfolio would be helpful)</td>
<td>![earned badge]</td>
</tr>
<tr>
<td>Introduce Yourself</td>
<td>Created an About Me page in OneNote using any application.</td>
<td>![earned badge]</td>
</tr>
<tr>
<td>Screencaster</td>
<td>Created and posted a helpful screencast on YouTube. (i.e. as an embedded YouTube clip in your Portfolio)</td>
<td>![earned badge]</td>
</tr>
<tr>
<td>QR creator</td>
<td>Added a QR code as link to web-based file (i.e. video or form etc.) for others to scan using their mobile device. This is an example of a QR code creator site: <a href="http://www.quirky.com">http://www.quirky.com</a> (Use the Blank option)</td>
<td>![earned badge]</td>
</tr>
<tr>
<td>Assignment Hacker</td>
<td>Successfully proposed and changed an assignment to meet my own challenge.</td>
<td>![earned badge]</td>
</tr>
</tbody>
</table>

I offered these digital badges to students and they could be earned and issued anytime throughout the course. I housed these badges in a student’s OneNote which was shared between themselves and me only. Students were the “issuer” of this digital badge but I could check that they met the criteria through our conversations and their progress in their OneNote Class Notebook. I liked this non-linear approach to the course, as very little management was needed from me yet the drawback was that my (naturally busy) students would often de-emphasize these accomplishments as a priority when compared to their projects especially during the “crunch time” as tests and assignments became more numerous from a multitude of courses. Finally, I did offer the opportunity for students to create their own virtual badges which is important as they had great ideas in the integration of new technologies. I will continue and refine these practices so that students help co-create the course experience with me.

Physical Badges
The physical badge is an excellent indicator of student progress and each badge was linked with a specific expectation in the course. As I issued the physical badge, many students would place the badge on their device which was great. Every student usually accepted the badge and I like how the badge became an indicator of their experience and progress with particular software. They were fun (as many comment indicate below.)

Creating the physical badges

I used the avery.ca site to link perfectly with the product number for easy printing.
I encouraged students to collaborate with their peers inside and outside the course with their “tech superpowers”. I shared a potential situation where a student not in the course would notice the Photoshop, Premiere (or other) badge on their tablet and then strike up conversation or potentially a collaboration for a school based or non-school based activity. This could be the start of a wonderful collaboration (and perhaps even a start-up) between with the badge as the conversation starter.

Student Feedback

I added a question to my outgoing survey for students about badging to get their feedback.

Did you like the badges to indicate your progress with our technologies? Why or why not?

- Yes
- No
- Neutral

[Graph showing the distribution of responses]
All and all, badging was a success for most and I will continue to refine and use this pedagogical tool with my students. Emphasis is as always on their learning and progress. The badge is and remains an indicator (not a reward) and I see it as a good opportunity to share an important moment with a student to value their hard work. Accessing student input and feedback is a gift and critical and I will make sure to have lots of copies of badges in case they get worn and torn in the hustle and bustle of our #tabletlife in our 1:1 environment. I also like the future potential for this practice as students’ progress continues when they move from the Grade 11 to 12 course. (Some may even put the badge on their portfolios and at our school we have student-led conferences and what about when they graduate…)

Thanks for visiting and I look forward to further discussions and chats on Twitter and specifically at #badgechatk12.

Interested in learning more?

How can digital badging aid learning?

What does Assessment look like in Makerspaces? (surprise, surprise, badging)

Digital Badging: a valuable addition to
Why self-directed learning is a powerful opportunity for educators

My Mom always said that I liked to be in charge of my own time. She would appreciate the irony that my students feel the same way! However, I still think it is vital to set your own goals as a life-long learner and educator. Self-directed learning offers rich opportunities for myself and my students going forward. The affordances of today’s technology (i.e. MOOC’s, open educational resources (i.e. video, screencasts, auto-graded assessments…) and social networking make today or tomorrow (or whenever!) a good time to explore self-directed learning as a vital and useful pedagogy for myself and my students in the foreseeable future. In addition, as a busy educator and parent, the opportunity to schedule my own learning without sacrificing my core focus on my family is critical and makes this form of learning very appealing. In short, my motivation is strongest when I select my own learning goals.

What is self-directed learning?

Self-directed learning is a self-motivated, informal and anytime/anywhere approach to learning using online resources. “In self-directed education, the individual masters all the activities usually conducted by the teacher: selecting goals, selecting content, selecting and organizing learning experiences, managing one’s time and effort, evaluating progress and redesigning one’s strategies for greater effect.” (Gibbons 2008) MOOC’s or Massive Open Online Courses provide an excellent opportunity for self-directed learners to select specific parts or entire courses to meet their learning goals. MOOC’s are offered by traditional and well respected universities (i.e. Harvard, Cambridge, Western, Toronto, London etc.) in an online setting with a capacity for a vast number of students facilitated through websites like Coursera, Udacity etc. At the conclusion of the course, a record of completion is added to your account and a validated certificate is available for a small fee and the validation of your identity. Essentially the experience is free and open to anyone with the motivation to complete all the requirements set by the instructor or one can complete the units relevant to one’s own goals.

What is my experience so far with self-directed learning?

1. Massive Open Online Courses (MOOC’s)
I have had a few experiences with MOOC’s through the Coursera site which were very positive. I completed a course from the University of London called “ICT in Primary Education” which was fascinating as I had a chance to interact with educators from all continents through chat-rooms and discussion boards. I definitely felt privileged by the accessibility of my students to the latest technology and was inspired by resourceful educators integrating technology as powerful learning tools for their students. Many dedicated educators were using all kinds of technology to aid their students’ learning despite facing challenges of equity, infrastructure and lack of support from communities. In addition, to the benefits of connecting with other hard-working educators, the course also included a collaborative and innovative aspect to assessment. As part of each assignment, students (mostly educators) were assigned a few random assignments of colleagues to evaluate using a specific rubric. With so many students in the course, an average of your scores was used for grading which was an innovative way to “crowd-source” assessment. 1 Feel free to read more here from my notes if interested.

In March of this year, I completed a course called Indigenous Canada offered by the University of Alberta which completely altered my thinking and world view on History and perspectives on events in Canada and North America AKA “Turtle Island”. In this course, I was introduced to familiar topics of Canadian History but using an Indigenous worldview and perspective. I was confronted with a worldview mostly hidden or marginalized from my formal education and life in Canada which was mostly taught using a colonial perspective. The intersectionality of aboriginality, gender, sex, culture, place of residence among others combined with institutionalized and informal racism and culture clash has resulted in many challenges for Indigenous peoples today. Yet, their culture and ideas continues to resonant though powerful ideology, their roles as leaders and stewards of the land and environment. In short, I was forever changed to be more emphatic and understanding towards Indigenous Peoples, recognize their diversity and their triumphs and tragedies (i.e. betrayals by settlers, institutionalized racism, Residential Schools and today less access to equitable health, infrastructure and justice from Canadian institutions.) Yet despite the critical evaluation and acknowledgement of past and present challenges for Indigenous peoples, the course emphasized hope and progress for the future which was inspiring. This course was so invaluable with powerful resources and perspectives to help me create a more inclusive and diverse History classroom for my students and myself as a Canadian. Here is a quick list of 150 acts of reconciliation which is particularly inspiring.

2. Technology certifications

Many companies including Apple with their Apple Teacher program, Google with Google Educator programs and Microsoft with their Microsoft in Education offer training videos, resources (i.e. OneNote folders) and even detailed online courses. Many of these resources lead to certifications and can be great for familiarizing yourself with the software and picking up some tips for best practices. However, it is critical that educators adapt these ideas to the specific needs of their students and learning goals in order provide richer learning opportunities. In our school, we have adopted Microsoft products mostly on the strength of the Microsoft Surface, OneNote and its digital inking possibilities and so I sought out the Microsoft in Education certificates and make use of Microsoft in Education portal and related social media for learning resources.

Here is a screenshot of some of the course selections available at the moment. More are added as technology is added or updated.
On the site, there are a number of courses which consist of videos and other learning tools and resources (i.e. OneNote folders and usually end with a quiz. The beginning of each course has the date posted, duration, likes and badges offered for completion. Upon the successful completion of the quiz (usually 80%) a badge is earned which appears on your account and as a record on a printable or sharable training transcript.

Here is an example of my achievements in the program so far. (Still much to learn)

The OneNote and OneNote Class Notebook resources have been particularly significant in our Upper School (G9-12) environment as teachers use OneNote for their professional practices and the Class Notebook with students in each class. I also regularly use Microsoft Forms, Sway, Photos, Flipgrid and Skype to provide unique learning experiences for my students. The benefit of this site is that it provides a collection of learning resources specific to my needs as an educator in my school. I have heard similar stories from educators using other software companies. (i.e Apple, Google etc.) Finally, I would feel comfortable sharing my designation (#MIEE) with others (i.e. colleagues, administration, potential employees, parents, resume, LinkedIn and other social media sites etc. to demonstrate my proficiency with this technology.

Another website that offers self-learning possibilities for educators is at Common Sense Media which specializes in educational technology and is particularly effective at promoting and providing materials for educators to teach Digital Citizenship with students. The Common Sense Media site also provides reviews and rates the appropriateness of media including games, movies, television programs and other technology for children, parents and educators. In the past, I have utilized their resources to create a digital citizenship curriculum in my school, develop digital citizenship through a web portal, help train teachers in the integration of tablets in a 1:1 setting and browse the educator reviews to explore the latest educational technology. I have provided app reviews on the site myself and contributed to their blog. Finally, the site also offers accreditation in the form of a badge and a chance to connect with similar minded educators in a PLN focused on digital citizenship and educational technology regardless of brand.
The Adobe Education Exchange is another site that is particularly useful to myself and my high school students who use Photoshop, Audition, Premiere and After Effects among many others in their school and personal projects. Our school recently upgraded to the latest Adobe CC platform and I am in the process of utilizing this portal to upgrade my skills from older versions of Adobe that is most familiar to myself and my students.

Learning resources include self-paced workshops to be completed at your own pace, collaborative courses which are offered over a particular time by a facilitator and a great way to extend your PLN, live events which are presented over Adobe Connect (A dynamic online tool which provides an excellent stage for online meetings, courses and webinars) and finally, Adobe offers accreditation called the Adobe Education Trainer to help others use Adobe products. The search option by ISTE and Common Core Standards is particularly interesting as ISTE are a leading organization for students and teachers that provide specific and well established standards to evaluate their technology skills.
So what is next for self-directed learning. ISTE are now interested in providing teacher accreditation for technology skills and coupled with their well-respected standards for students and teachers and technology curriculum. They critically evaluated this question and it is clear they now see the value of offering accreditation for educators as indicated in the tweet below.

In case you missed it last week, we've announced our first-ever teacher certification based on the #ISTEStandards. ISTE Certification for Educators is a competency-based, vendor-neutral certification focused on digital age pedagogy. https://t.co/hjioTzVvpL pic.twitter.com/NdW7OKF4eX

— ISTE (@iste) May 30, 2018

https://platform.twitter.com/widgets.js

Sites for learning to code and developing your computational thinking skills like Codecademy (and many others) are suitable for a self-directed learning approach. Lynda.com (many local libraries offer free access) is very helpful for videos and courses on specific technologies. YouTube of course is helpful but can be “hit-and-miss” if looking for specific skills. Finally, social media sites like LinkedIn and Twitter are so helpful when educators share links to their teacher-created tools, guides and resources to help your professional practice. (Just like I am doing now.)

Finally, I wanted to mention that self-directed learning should NOT replace but instead supplement more formal learning in educational settings. (For me, after four years completing my Masters encouraged me to continue to learn and establish new goals using the new affordances and online learning environments available today.) I hope this was helpful. What self-directed learning resources have you found helpful in your experience or professional practice? Feel free to add your comments and suggestions below.

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1. I believe that a high and low score were eliminated from your score to help with normalization. Also as a student I believe there was an option to "appeal" your mark if needed. Personally, this course was all about the experience and the grade was secondary.

OneNote is my ultimate curation and organizational tool – OneNote in Education
Part 1 of 3

There is no question that OneNote is the most significant tool in my day-to-day work as an educator. It has featured in my teaching practice since 2008(!) In the next few blog posts, I will outline some of the ways I use this software to enhance my professional practice.

OneNote aids my teaching and learning in three significant ways. Firstly, I use OneNote as a private "thinking space" to explore and refine my ideas by curating research from online sources, links, documents, notes and even sketches (despite my lack of artistic skills!) Secondly, I use it as a dynamic intranet in my school and learning community to collaborate, share and connect with colleagues for day-to-day school life. Finally, I use OneNote and specifically the OneNote Class Notebook as a vibrant, comprehensive, pedagogical and learning space to interact and engage with my students using a few different levels of collaboration. I currently teach History and Communication Technology at the high school level, and I try to model my own use of OneNote as a learning tool and provide opportunities for students to use OneNote to explore their own private ideas in a safe "sandbox". Not only does OneNote provide a safe place for them to develop their ideas to their potential but I actively encourage them to extend their ideas without fear of failure and adopt a growth mindset as articulated by Carol Dweck. In this digital space, I look to provide guidance, help and support at appropriate times to aid their progress and learning.

I truly value the idea of having a safe, private and versatile tool to record and refine ideas and OneNote provides this affordance as part of my information gathering and ongoing research. I have lost track of the amount of times I have later re-read or re-used materials for a lesson or presentation that I have collected and curated in a OneNote folder from my reading. OneNote provides a digital space curated by me to recall (and rediscover) ideas and materials. One of the challenges of self-directed or directed professional development is timing so that I can recall and apply my learning at the exact time needed in his profession. OneNote allows me to curate, save for a later time with easy recall thereby allowing me to work more effectively. Harold Jarche in his blog and writing outlines his Personal Knowledge Management (PKM) method which he "describes as a set of processes, individually constructed, to help each of us make sense of our world, and work more effectively. He has developed a popular Seek-Sense-Share framework which identifies the 3 key elements of PKM" (Hart, Web)

Below I created a diagram that outlines my daily habits in terms of knowledge accumulation based on the ideas of Jarche and inspired by the design of Hart. I re-created and personalized this diagram by adding the platforms and software relevant to my routines in the SEEK and SHARE stages.
OneNote offers opportunities to archive my research into relevant tabs, tags and pages with a search bar thrown in for good measure. When I am in the SENSE stage, I am either co-creating understanding of the material with my students or colleagues or simply storing the materials (text, media, links etc.) away for future analysis and study. OneNote is my choice for archiving relevant materials as it is more versatile than social bookmarking services as I can retain the material rather than being at the mercy of links remaining live or at the same URL. I use the Clip to OneNote browser extension but could also simply copy and paste the text and media from the web as OneNote automatically records the URL. The other advantage of this approach is that it keeps the material searchable in OneNote which is a time saver.

A Printout to OneNote is also available as a back up but the text is not searchable unless using an image to text conversion which cuts down on efficiency. Combining this routine of information gathering with the affordances of this software to include text, links with sketches, files, video, audio and increasingly more embeddable content (i.e. forms, videos etc.) allows OneNote to become a “redefining” tool for research, archiving and writing for teachers, students and learners. (Tagging the material is also an excellent routine but that aspect demands a separate post.)
Below are a few screenshots from my OneNote folders below. I currently organize my notebooks by topic and course.

I use it to plan lessons with files, links, notes and reflections close at hand.

I use my folder to collect documentation that includes embeddable video content.
In Part Two, I will discuss and share some of the ways in which my colleagues and I use OneNote as a working space and intranet to share and collaborate on our day-to-day adventures as educators in school life. Finally in Part 3, I will explore the advantages of the Class Notebook add-on which allows me to co-create my courses with my students creating a digital textbook and how OneNote can serve as a vibrant, creative, safe space or “thoughtbook” for innovation and design.

Thanks for reading. What did I miss? Feel free to comment below to make suggestions with how you use OneNote or other tools you use for archiving.

References


Can you code on a mobile device? – Critically Examining mLearning Tools for K-12 Programmers and Coders

As the proliferation of technology continues globally, we face a growing need for programmers. Yet the demand for Computer Science graduates outweighs our supply (code.org, 2016) However, global users of mobile technology continue to grow at a vast rate. It is worth critically examining whether mobile technology could be a useful option for aspiring K-12 programmers to learn, explore and share their computational thinking. Both coding and programming are key aspects of the D.I.Y. maker movement and yet mobile technology has often been identified with the “consumption” of media and learning rather than being a tool for design and creativity. Greater scholarship is needed to explore the potential benefits, limitations and challenges for programmers and coders to learn, tinker and test computer programs directly on mobile devices. Some considerations might include speed, flexibility, convenience and greater accessibility while...
users are situated in creative and collaborative spaces like makerspaces. It is important to critically examine the applications, web-based resources and hybrid tools available to aspiring programmers for their potential to explore core programming concepts and frankly address the current challenges, implications and limitations. As a greater number of people use mobile devices regularly, perhaps there is a potential opportunity to train and support programmers who can code and iterate directly on their devices. Considerations will also need to made to the changing approach and intent of corporations like Apple or Google and their willingness to allow consumers and potentially makers greater flexibility to “tinker” with and program the software and/or OS of their mobile devices. There are some benefits and implications for allowing devices (or aspects of devices) to be programmed or alternately, “locking” down some if not all consumer options for programming.

**Keywords:** Applications (Apps), Coding, Computational Thinking, Computer Science, Hacking, Hybrid Applications, Making, Makerspaces, mLearning, “Mobile First”, Mobile Learning, Programming, STEAM (Science, Technology, Engineering, Arts, and Mathematics), STEM, The Internet-Of-Things, Web Based Applications

### Introduction (Framing the Problem)

There is currently, and will continue to be, a high demand for employment in Computer Science yet there are not enough graduates. “Computing occupations make up 2/3 of all projected new jobs in STEM fields.” (code.org, 2016) Yet only 8% of STEM (as defined as Science, Technology, Engineering and Mathematics) graduates study Computer Science. (code.org, 2016) The challenge becomes mentoring K-12 students and educators to see the potential for computational thinking and programming as a creative exercise. Perhaps then text-based programming and Computer Science will be more accessible and encourage greater numbers of students from a variety of diverse backgrounds and gender to pursue (and graduate with) a degree in Computer Science. Using the CSAM framework (Power, 2013), this post will critically examine resources and platforms for aspiring programmers using mobile technology.

### Why Learn to Code on a Mobile Device?

Mobile devices today provide new opportunities and challenges for all involved in education. Some schools have banned the technology; others have begun explore using these “mini computers” as tools for learning. According to a 2013 study, 78% of teens and 91% of adults own a mobile phone (Madden, 2013) and teachers must adapt to learning environments they never experienced as a student. (I imagine the numbers are probably even higher today.) Learning Models like the TPACK (Koehler, 2009) or SAMR (Puentedura, 2014) can aid educators and curriculum designers with a critical lens to explore the purpose and intent behind their integration of technology. The TPACK model emphasizes the place of technology, pedagogy and content and their interaction and is helpful for a critical analysis on the place of programming for learning.

![Figure 1 - The Seven Components of TPACK (2012)](image)
With the SAMR model, the integration of technology is contrasted with an offline activity. Using technology to redefine tasks and provide learning opportunities that were never before possible remains a strong argument for technology integration. Whether that learning is best on a mobile device or a computer is another an important consideration.

**Figure 2 – THE SAMR model (2010)**

The CSAM framework (Power, 2013) provides an important lens by considering if an activity using mobile technology is collaborative, situated to critically examine effective pedagogies for using mobile technology for learning.

**Figure 3 – THE CSAM mode (2013)**

Connections and compatibility between the CSAM and TPACK and CSAM theories have been established (Power, 2013) by merging the affordances of the technology with sound pedagogy. These compatible models provide a powerful lens by which to analyze the pedagogy involved in utilizing mobile devices for learning to code and write programs for technological devices.

Programming is fundamentally an exercise in computational thinking which combines critical thinking with the speed and power of computing. According one of the leading organizations for the use of technology, computational thinking is a problem solving process and includes the creative use of a computer, critical analysis and representation of data in a variety of formats and uses technology to present solutions in an
efficient amount of steps and resources. (ISTE, 2016) Mobile devices provide a unique platform for learners to explore computational thinking and become creators rather consumers of technology, in this case coding applications or even the operating system itself. While some tinkering on the operating system (i.e. jailbreaking) is a possibility for programmers, users are mostly encouraged by companies to use applications to develop computational thinking. Some companies like Android are keen to share “open source” programming for all to see, explore and iterate while others like Apple are more proprietary and employ “closed shop” on revealing their code with design, user friendliness and elegant user interfaces only available to tinker by their professional designers.

Programming applications can be categorized into block-based, text-based applications with some functionality and text-based applications for writing and testing on all devices. Another important distinction should be made between “open studio apps” when users start with a blank canvas for users to program from scratch (Patterson, 44) and apps provide motivators for learning like badges, stars, levels etc. Both types of applications provide opportunities for mobile programmers dependent in the situation or challenge and their level of programming proficiency.

Coding on a Mobile Device (Beginner to Advanced)

Block-based applications are where beginner programmers can learn to write code by manipulating a virtual objects or spaces by dragging and dropping blocks together like digital Lego pieces. Not surprisingly these applications are usually targeted for elementary students. The Scratch website designed by Michael Resnick and his team at MIT provides the most widely recognized example of block-based programming and has been successful due to its inclusion of Seymour Papert’s concept of a low floor (easy to get started) and high ceiling (opportunities to create increasingly complex projects over time). (Resnick et al., 2011) In other words, novices can quickly make something fun with some coaching but have the potential to create sophisticated applications as evidenced by the over 16 million unique and remixed projects found on the Scratch forum and website. (Scratch Statistics, 2016) However, a mobile version for younger coders is only available with the popular Scratch is not available.[i]

Its closest equivalent is an application called Hopscotch.

![Figure 4 – Screenshot of the stage from Hopscotch app (2016)](image)

Hopscotch is a good example of an “open studio app” where users create commands for a virtual object and/or spaces by snapping blocks together from a blank canvas. Examined through the CSAM framework, users can collaborate face-to-face or even share their projects through a modest web-based forum and the block commands allow programmers to code using key concepts like loops, conditionals among others but more advanced programmers might debate how situated is this learning when the majority of programming is text-based. Applications like Code Monkey, Karel and Blockly allow users to toggle between block based and text based views but only Code Monkey is available as a mobile app. It might be argued that Code Monkey is not active as users’ complete challenges and puzzles that test a users’ knowledge and application of programming concepts and ideas rather than have a canvas for creation. In contrast, the active element is well established in Hopscotch as it has a creative canvas for unique and remixed programs. Overall, Hopscotch meets all four elements of the CSAM with some room for improvement by toggling views from block-based to text-based code.
Tykner is another block-based mobile application with both “open source” elements and learning modules on key programming concepts. Although the graphics are very engaging, it suffers from missing elements when compared to the web-based version and is subsequently not indicative of mobile first design. However, it performs well using the CSAM framework with online forum for collaboration, as well as an active space for creation.

For most block-based applications, perhaps more might make use of the features unique to mobile device itself beyond the camera and microphone i.e. gyroscope, GSP, accelerometer etc. In addition, students using their own devices would be more likely to demonstrate ownership and flow using the familiar technology of their mobile device. Overall, Scratch Junior, Tykner and Hopscotch among others are excellent places for aspiring programmers to demonstrate their creativity and competency using the flexibility and convenience of a mobile device. More emphasis on situating them by toggling between text and block and easier sharing and collaboration would be considerations for future updates for age appropriate applications.

Programmers usually “graduate” from block-based programming to text-based coding and mobile devices provide many applications for text-based programming in a variety of programming languages. Many applications are simply more streamlined versions of web-based or installed software on a computer yet most highlight uploading files to online storage sites like Dropbox as a key feature which suggests that full parity with computers has not yet been achieved. Others like Code Combat and Code Warrior provide a game-based environment for users to learn programming rather than a creative space. Subsequently, they are less situated in a realistic environment of programming. However, two applications Hyperpad and Codea, which are designed mobile first and meet the criteria of CSAM framework.
situated as users can create develop, share their creations directly into an App Store, active as the app can be iterated on the device and finally mobile as programmers can work offline and on the device itself.

Figure 7 – Screenshot from the Codea app (2016)

Codea is another visually based programming tool unique to the iPad which uses visual features to facilitate programmers by using a visual platform and an extensive library of resources for rapid prototyping and creations. It satisfies the CSAM framework for collaboration with a link to “Codea Talk” forums. It is situated as successful games like CargoBot have been created and deployed directly from the application. It is active space where users can start with an editable template edit or on a blank scratchpad. Finally, it is mobile through its deployment on an iPad yet not editable on phone yet. Both Codea and Hyperpad make decent use of capabilities and allow users a creative and collaborative space to design apps and learn, test and share their coding directly on the device.

However, it is at the next level of complex that we lose the opportunity for a variety of programming tools to code directly on Apple devices. Sites like CodeAcademy and Udacity are simply portals for learning to code that is assumedly fully actualized on a computer like Mac or Windows computer. In other words, actual coding on Apple mobile devices at the most advanced level of programming is not yet fully situated outside their proprietary Swift Playgrounds application users. Android provides much better opportunities for programming through easy access through an API to the majority of programming languages for application on both mobile and computers. Programming on Android using a variety of applications meets three characteristics of the CSAM framework with some improvement needed for collaboration only available through external sources like YouTube or social media. Non-Apple programming is more possible using Android despite limitations on collaborations and an arguably less user-friendly user interface.

Figure 8 – Screenshot from TouchDevelop (2016)
One final entry in this analysis of coding on a mobile device is a Windows application called TouchDevelop which is accessible on their Surface (and perhaps even a future Windows phone.) It meets all CSAM categories, with excellent resources to help users transition from block-based code to text-based coding, an emphasis on both a good user interface and with strong collaborative options. Users can create programs for use on iOS, Android, Windows, Mac or Linux. Windows is seemingly offering another option to the Apple vs. Android dichotomy for users learning and exploring computational thinking on a mobile device.

**Conclusion**

Overall, mobile technology is generally a positive device for coders and programmers but their experiences is dependent on the device, company and operating system. As the Internet of Things, continues to expand, future programmers may need to write and de-bug code on a variety of objects and places which favours mobile technology. At the moment, I must concede that computers do offer more affordances and complete functionality for programmer. However, Apple’s creation of a mobile programming language called Swift acknowledges user demand for increased access “under the hood” of their mobile devices to pursue their entrepreneurial ideas (and aid Apple as the time time.) Alternately, Android’s “open source” approach is not completely preferable either. Pushing out fixes or updates to correct key security flaws and improving user experience are difficult with the fragmentation of the Android product line. Perhaps Windows offers a third way with a flexible OS that can toggle between mobile and computer interfaces which benefits mobile and computer programmers. Users would be able to transform their “mini computer” to a full sized one by connecting to the larger screen. (Welch 2015) After all, the processing power of phones is now comparable to many computers and storage can be mostly cloud-based. Ultimately, the difference between mobile and computer technology may boil down to screen size, user choice and the best devices will allow users to program any smart device.

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By achuter • Posted in educational technology

What does Assessment look like in Makerspaces?

Makerspaces provide new affordances for learners and creative types to explore new and exciting branches of learning, creating and exploring from 3-D printing, e-textiles to computer-assisted-design. This leads me to wonder about the role or best stance for educators in this environment. According to Barniskis (2014), “…many teachers are used to teaching a large group of children to work on one project at a time. However, in a makerspace environment, each student may be working with different tools and processes. The teacher needs to be comfortable with a considerable quantity of chaos in such an environment, as well as skilled with all of the tools and able to switch gears quickly.” (p. 6)

In particular, it is the “switching gears” where educators assess learner proficiencies to inform next steps that is the subject of this paper. First, we’ll examine makerspaces pedagogies and consider the teacher’s/facilitator/coaches role, then explore and analyze the use of “traditional” assessment strategies in makerspaces, and finally, suggest three assessment strategies that seem well matched within a makerspace. Overall, we will consider the role of assessment in makerspaces and how does it need to be modified or adapted in this setting to help our makers?

Makerspace Pedagogies

In makerspaces, the role of learner has evolved from a passive recipient of information to the learner as an active creator and/or maker. The new affordances like 3-D printers, programmable robots, e-textiles, among many others provide a new and increasingly complex canvas for digital designers to build and make. With externals like MakeyMakey, Lego WeDo or Mindstorms, a makerspace can also be an environment that encourages makers and creators to computer program using languages from with “low floor” like block-based Scratch, or text-based Arduino or beyond. Yet, even with these tools that encourage creativity and design where students and makers might pursue their own projects, the role of the coach/educator/facilitator is crucial. They can encourage students to not only learn new skills but also feel comfortable and confident to create, make and perhaps even innovate. Striking a balance between teaching established and traditional elements and principles of design and also encouraging them to innovate can be tricky. The role, stance and practices of the educator are critical so that makerspaces can become a unique place for creativity and design and not simply another room where a specific set of instructions are “delivered”, then copied and...
Current Assessment strategies

Being evaluated is a key and yet sometimes challenging experience for most students (and perhaps everyone) historically and today. Yet educators acting as mentors can have a vital role in helping others develop their ideas and improve the design and functionality of prototypes. The role of mentors or coaches requires a modified approach than a traditional – teach then evaluate model. A review of makerspace literature and research seems to indicate that traditional evaluation and assessment methods continue to be considered as indicators of progress. For example, in some studies, the focus of assessment has been less on creativity and more on specific measureable outcomes determined beforehand by the teachers and curriculum designers. While determining key concepts and core fluencies is critical, perhaps a more flexible learner-centered approach would seem to be a better strategy than one based on immoveable standards. This is especially important in spaces that encourage creativity, innovation, design and perhaps arts. In regard to e-textiles, Peppler (2013) emphasizes art first “…that the e-textile designer is less concerned with coding efficiency—having as few lines of code as possible—than with achieving a particular artistic effect” (p. 38). Assessment remains a critical strategy to help mentor our makers and creators to extend their learning through their Zone of Proximal Development. (McLeod, S. A. 2012 para. 1). Yet in some studies, the justification for makerspaces seems to fall back on numbers to quantify students’ outcomes and progress.

“When we analyzed their final Scratch programs using Brennan and Resnick’s computational thinking framework [2], we found that 100% of the projects used sequential statements, loops, conditional statements, event handling, and 85.7% (or 6/7) of the projects used operators.” (Davis, 2013, p. 440).

Here is another example “…when the multimeter was used, boys had the equipment in their hands 75% of the time on average to only 25% for girls.” (Buchholz et al., 2012, p. 283).

These quotations seem to focus on specific quantitative measurements (i.e. use of specific computer science skills and use of a specific tool by gender.) Both these measurements are important as ONE form of analysis yet neither evaluation indicates a focus on creativity or innovation. Furthermore, they may actually be only a small step from a mark-based assessment with such narrow focus. For example, a student might earn an “A” mark for simply including a certain amount of loops in their project. Perhaps a model where students and teachers negotiate shared objectives would encourage more creativity. Kohn (2011) seems to reject any traditional form of teacher determined grades in educational spaces saying instead “…students can be invited to participate in that process either as a negotiation (such that the teacher has the final say)…” (p. 6). No doubt, the promotion of computational thinking and gender equality are critically important indicators for success, but perhaps assessment in makerspaces should be specifically focused on creativity, innovation and digital citizenship (helping others) above other specific technical requirements. In other words, a successful project might not include all the computational requirements nor be in the hands of a specific gender and still produce a creative and innovative prototype. Perhaps then assessment strategies should focus away from marks as indicators and instead look towards more qualitative methods that demonstrate a maker’s thinking and detailed progress. In addition, it is unclear whether a grade reflects the “potential” of an idea or a “snapshot” of the project at that time. Subsequently, this type of mark-based assessment in quantifiable terms obscures rather reveals student progress, creativity and potential.

Three Methods of Assessments

Perhaps makers and educators might instead work collaboratively to critically evaluate designs based on principles like Design Thinking that encourage both process and final product through a variety of activities and practices. Based on research into makerspaces and practices, three types of assessment tools seem to be good fits for makerspaces: design journals, reflections and badging.

Design Journals

A design journal can be either physical or digital and is a place to notes and instructions about a particular prototype or program. With prompting, students can not only write about the process but also be prompted to engage in new forms of thinking and processes like design thinking. Design thinking is an excellent process to solve challenges and promotes a similar mindset to makerspaces with its emphasis on creativity, design and iteration. One excellent example of a design journal is found in the project page of in the web-based Scratch 2.0 site. Scratch is an excellent tool for block-based coding and has both Papert’s ‘low floor (easy to get started) and high ceiling (can be used for increasingly complex projects).’ (Resnick, 2009, p.63). In addition to a page to create block-based commands is a project page which could be a design journal. Each project page (Figure One below) has three sections for writing: instructions, notes and credits and a comments stream. The first area provides a place for instructions critical for those wanting to run the Scratch program. This area explores the use of each sprite, backgrounds and other commands.
The Notes and Credits section provides a place for the programmer to comment upon the design of the program including sources for resources used, a brief summary of their thinking, current progress and next possible steps. These possible next steps might be influenced by the comments section (which can be toggled on or off) by fellow programmers and Scratch users to provide feedback for the original programmers. Comments have the potential to be a shared and logged conversation about programming and specifically Scratch. In its highest level, it is collectivism where programmers and designer collect their best ideas on programming and designs in the Scratch forums. In Scratch, an ultimate form of flattery is the re-mix where programmers make a copy and tinker with a new iteration of the program which also includes a vital and transparent record of the original creator. This “built-in” design journal provides excellent opportunities for assessment as educators can observe not only the program but the programmer’s dialogue with themselves and others. Educators could even join in the collective conversation embedded directly in the project with comments, suggestions and encouragement of their own. According to Nichols (2015), “as students document their thinking they are supported by community partners who act as mentors to promote their thinking and give them the real-world exposure and experience they need to overcome challenges” (para. 5). Nichols calls them “thought-books” and they could serve as a hybrid design journal and place for reflective writing. It is important to note that design journals could be in many different forms from traditional physical books to more sophisticated online creations like the OneNote Class Notebooks. (See Figure Two below for an example from one of my classes).
Reflective writing

For more depth into the thinking of learners in makerspaces, reflective writing could be another assessment tool for educators to explore the metacognition of makers and creators. Using tools like physical notebooks or even digital forms like blogs, makers and creators share their goals, process and experiences from their perspectives. If this reflective writing is shared, then educators and mentors can potentially have insight into the “black box” that is a learner’s thinking. Access to this form of writing allows mentors and educators to help learners “level up” and reach the next stage for their progress or even when to “move on” to something new in the Zone of Proximal Development (Vygotsky, 1978, p. 86). In short, makers and learners need to focus on the process being as important (or perhaps more) than a “final” product. Reflective thinking and writing should take place at various points (say beginning, during and end) as creation and making is occurring so that educators can see the process of student thinking and suggest next steps or extend thinking further when needed. Educators and mentors can leverage reflective writing of makers and creators to provide feedback in the form of constructive dialogue. They can also use this tool to plan next sessions and provide learning materials and guidance for the specific needs of makers and learners. Indications of progress and identifying next steps are part of the final assessment strategy using badging.

Badging

The awarding and distribution of badging can be one way to facilitate the conversation between makers and mentors through the awarding, earning and sharing of micro-credentials. “Digital badging recognizes learning and growth wherever it happens and helps people connect their accomplishments across institution types.” (Fontichiaro, 2015, What is digital badging? para 2) Digital or physical badging has the potential to recognize and indicate learning outside of traditional classes and in unique environments like makerspaces. These tools are new to education but have been successfully used in organizations like Scouts or even objective-based video games. In other words, some students would have prior experience with badging in both physical and digital badges forms. However, bringing this assessment into the new and evolving “anywhere classroom” including a makerspace offers new opportunities for learners and educators to record their progress.

Badging could be an excellent indicator of the wide variety of skills, abilities and progress made by learners in a makerspace. However, there are a few criticisms that should be examined before utilizing badging for our makers. Some like Seliskar have cited badges as a motivating tool, yet I think that using badges only to motivate could have the opposite effect. (2014, para. 1) They might serve as a motivator in the short term but might be better served as a digital indicator of learner progress as issued by educators, mentors and specialists. The idea of a “badge economy” is a much more powerful concept with a longer timeframe as they provide a record of subject or skill mastery. In a “badge economy” student earns a backpack of badges with each carrying everything needed (i.e. metadata) to understand the badge (who gave it, what is it for etc.) Sunny Lee, a product manager from Mozilla suggests that “The digital backpack enables the learner to be able to curate and manage the image that they want to represent to the rest of the world… the idea is that we’re kind of laying down the plumbing for this badge economy to flourish. Now, we need some badges circulating around the economy to jumpstart it.” (Ash, 2012, p.28) Makerspaces would seem ripe for the creation of many badges (i.e. mBot programmer) that learners could add to their backpack. (See Figure Three below for example badges.)

Figure Three Sample badges

In this assessment model, students acquire key knowledge from a curated list by educators, curriculum designers or specialists in order to earn teacher-created badges. Teacher created badges are essential as they could serve as indicators for makers/creators or programmers to “level-up” their skills. For example, educators could indicate and celebrate students’ initial progress on a particular tool (i.e. Level One) but create a scale to encourage them to explore the tool and their own creativity in more detail (i.e. Level Two…) According to Grier, “... the best approach to scaling digital badging is not to focus on students, but on their teachers.” (2015, para 3). Teachers can provide the expertise to encourage next steps and extend thinking.

Perhaps an even more student-centered approach is a co-creation model between learners and educators to create a unique learning pathway for makers. This co-creating model has the potential for students to demonstrate core competencies but leaves room for creativity and innovation so critical to leveraging the potential of makerspaces. Like ‘stepping stones’, learners navigate their progress throughout a specific area of focus with badges as indicators and then earners decide to keep private or share (with interested parties) along the way. Teachers might help students create a “…portfolio that reflects the skills and knowledge they
These badges could then be shared online at the discretion of the badge earners. Ash states that “…the badge earner must be responsible for managing his or her own badges.” (2012, p. 28). Putting the sharing permissions in the hands of the learner is critical as no doubt in their mind or the minds of others (institutions, employers, even peers etc.) some badges will have more weight than others. This is certainly a valid criticism but the metadata in each badge will indicate the date, issuer and skills learned and demonstrated for clarity. This metadata is a clear indicator of learner’s progress with sharing permissions at the discretion of the learner. The transferrable and sharing potential for badges through sites like credly.com or badgelist.com and housed on wikis, blogs or websites provides new opportunities for learners to share their progress, learning and success. This not only allows learners to find success but also to create a strong digital footprint potentially leading to future learning and collaboration opportunities in global settings. The Mozilla Open Badges might provide this global setting as place for learners to collect badges earned and issuers to add badges in a learner’s digital “backpack”. (See Figure Four below) However, the appealing nature of the issuing of these micro-credentials is that earners can decide to showcase and share the progress and achievement through the web to interested parties (i.e. recruitment for makers) in global market place of the internet.

More on Collaborative Assessment

Collaboration beyond student- teacher relationship also offers opportunities for makerspaces. The successful collaboration of educators, curriculum designers, researchers and specialists will aid learning environments and makerspaces that emphasize design and making through varied perspectives on student progress and perspectives. “If teaching artists partner with the shop teachers, home education teachers, and computer science educators in schools, a multifaceted makerspace can emerge.” (Barniskis, 2014, p. 7) Makerspaces can be a good gathering point for conversations between learners with many different types of specialists and experts on next steps and sharing of progress.

Design journals, reflective writing or badging need not be public but can be the basis for crucial
conversations concerning next steps between makers and peers or makers and mentors. Educators might plan out time for makers to have these conversations which will only help the makers in their learning but also provide evidence for educators on the progress of students. Even the conversation could be used for assessment, which might be recorded through a page in a design journal, written reflection or even a badge. Making a “pitch” and hearing feedback from peers or experts are an important element in the design thinking toolkit for educators and makers.

Finally, conversations with other parents, guardians and other important figures in a student’s life can have an impact on learning and assessment as educators gain a wider perspective of student progress. Creating connections between home and school through open communication between educators, parents and students can be important to help educators create authentic experiences for students to learn and make progress.

Conclusion and Next Steps

Based on research into makerspaces and practices, three types of assessment tools seem to be a good fits for makerspaces: design journals, reflections and badging. Design journal and reflective writing are two strategies that emphasis metacognition and encourage learners to self-evaluate their progress in makerspaces. Learners can then choose what to keep private, or share with peers in a co-learning or collaborative structure and finally, engage with experts globally. Use of reflections at different stages of projects with a variety of audiences can also be critical to encourage increasing authentic feedback, assessment and evaluation for makers. Reflective writing and design journals are powerful tools for design thinking strategies. Badging is another pedagogical strategy that might serve to clearly indicate the desired outcomes (i.e. design, computer science as well as an implied gender balance) and yet encourage students to explore a breadth (and depth) of maker tools in an open-ended way. In addition, these forms of assessment are easily incorporated into design club routines and workflow. (see Figure Five below) If makerspaces offer new pedagogy and opportunities for students, then challenging and critically evaluating our assessment practices is vital if we are to encourage student success and innovation.

Figure Five Workflow model

In terms of assessment, I do not mean to suggest that creativity and innovation should be the only focus in a makerspace as no doubt equitable access, student enthusiasm, gender equality, computational thinking, curriculum expectations, digital citizenship are vital. In fact, the powerful affordances in makerspaces may even allow makers to make progress regardless of the stance of educators. However, switching between a teacher-centered to student-centered stance and using assessment practices like design journals, reflections and badging allow for mentors and educators to better explore the “black box” that is the mind of the makers. These tools could provide the necessary support for makers to grow and flourish. According to Fessakis et al. (2013) “… the teacher’s role during the proposed learning activities (computational) was critical. She encouraged and supported the children to overcome their difficulties, controlled the various coordination issues that came up (e.g. the next player’s turn) and handled the cases where the children seemed not to be able to deal successfully with.” (p.86). Overall, makerspaces offer learners to opportunities create a unique pathway with new and exciting experiences for learners and mentors who can support, assess and even co-learn.

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Exploring Critical Making as an approach to learning for teachers and students

I started my new course of digital making. Below are a few images about my journey using this technology so far. Look forward to adding more pictures, resources and experiences as I learn more and explore new “making tools” with colleagues.

Here is a link to my blog on this journey so far.

My top 3 designing & coding moments from this term to honour Computer Science Week 2015

A very busy term (It seems like I am saying that a lot these days!) with a quite few coding and computer science opportunities. Here are my top three moments from the term.

1. This message from my son yesterday in his #HourOfCode. (His pride was enough to bring a tear to this #GeekDad’s eye.)

   “Wow Dad, we did Minecraft at school today!”  
   #HourOfCode  
   pic.twitter.com/oslas4rj3e
   — Anthony Chuter (@anthonychuter) December 11, 2015

2. Teaching students to hack their assignments by integrating programming languages in our Design Club with some amazing colleagues.

   “I decided to use #Scratch for my social studies project” Nice job hacking your assignment N!  
   #bvgdesignclub  
   pic.twitter.com/JtkddG75Vo
3. Presenting at #bit15 conference in November. Such a great way to connect and share with colleagues. (Got a great idea for Makey Makey sword project to add some extra live action fun to his Minecrafting!)

Here is my slide deck.

For more information about coding, design and Computer Science for kids, please visit my page at https://ict4kids.ca/scratch

Next term, two worlds in my life work and school collide even directly (actually…that was my goal for going back for graduate work as I take a course for my Masters call “Digital Making” which seems quite appropriate…

Showcasing the progress of a learner over a specific time is probably a teacher’s greatest joy. (Ok, let’s not forget parents or even accompaniment providers!). As children grow up, those around them see this growth and speculate over the circumstances that brought it about. “These circumstances” might be defined as curriculum and if the experience for children and older learners is designed with purpose, can impact a learner’s journey in powerful ways. Now imagine you can have a record of this progress. The promise of today’s technology is that we can now design a portfolio of individual learning (in multiple mediums and
media) over a short, long, wide, or narrow timeframes among many other permutations. This individualized “container” can serve as an incrementally authentic document that demonstrates curricular expectations with more depth and understanding of learning than our current modes (i.e. report cards, teacher-parents interview etc.) Individually, fragments of learning have always been available for review but portfolios allow designers to curate a collection of learning perhaps by theme, subject, age etc. Designers should probably be the learners themselves but educators and curriculum developers could purposely collect on a learner’s behalf. This post will analysis the potential of digital portfolios to showcase a learner’s progress following a specific curriculum through the lens of change theory, curriculum theory, and other learning theories. The focus will primarily be on the impact upon the student-teacher relationship but when appropriate analysis could be extended to a learner-accompaniment provider scenario.

What is a digital portfolio?

A digital portfolio is a container of documents, files, pictures, media, conversations that record a learner’s progress against a specific curriculum or express an individual’s life-long journey. Curriculum designers and educators have a unique opportunity today to set up structures for learners in their care to collect and create a digital record of their progress in a specific curriculum with the potential and likely longer “shelf life” than a physical portfolio.

Why digital portfolios?

“It is imperative (today) students be able to curate, archive and expand on the work they are producing in class. As an added bonus, student digital portfolios help students authentically learn important digital citizenship lessons. Portfolios also allow students to internalize vital digital literacy skills such as creating their own digital web presence and learning to effectively and purposefully share their learning with the world.” (Clark, 2014)

Curriculum developer can leverage this opportunity to encourage dialogue, reflection and a potentially wider audience to showcase learner beyond the traditional student to teacher sharing.

What different types of digital portfolios are available?

Clark divides portfolios into three types: process where learners are asked to create a product and use the document to reflect, showcase which highlights a learner’s best work and a hybrid model which presents both the showcase pieces and steps made to get to the final product. The emphasis on reflection in both the process and hybrid model are critical as learners can be encouraged to take a reflective stance as Lafortune suggests and educators have more insight in a learner’s Zone of Proximal Development by Vygotsky. Choices for a container will have an impact on the nature of a portfolio but they are a few characteristics that are vital. A portfolio should include versatility, compatible with multiple media especially images, videos and sounds recordings and finally, easily sharable with others. Best practice would also include the option to have different degrees of sharing (i.e. with one individual, within a learning community, public etc.) and to toggle sharing on and off when work.

Google Sites and Voice Thread and other web based tools offer these options to collect, share and comment upon in manner that support dialogical learning encouraged in the works of Freire and Lafortune.

“Portfolios give students a chance to develop metacognition, set goals and internalize what “good work” looks like. Blogs offer a platform for creativity, communication, connection and the practice of digital citizenship. “Blog-folios” are the best of both worlds- using a blogging platform to develop writing skills, provide opportunities to connect with an authentic audience and increase reflective practices.” (Hernandez, blog) This last model is focused on a reflective stance and students can use their blog to celebrate their achievements and most importantly, their change of thinking as a result of a specific curriculum.

Who should collect and curate the digital portfolio?

To keep a portfolio as authentic as possible, it should be curated by the learner themselves engaged in a particular curriculum. This document can reflect how a learner’s “concept of the self” (Lafortune, p.62) as that changes throughout the course of study. This will encourage dialogue between the educator and learner to aid the next steps for learners in their ZPD and also allows educators to adapt to a learner’s emotional state and their affective domain. Students in the action of creating their portfolio must shift from a passive state to an active one as they are creating his or her understanding of the new material. In doing, change is
Theoretical support for portfolio to record and encourage change
Portfolios potentially reflect a learner’s perception of the curriculum. This access to the internal curriculum of the student could be very useful for educators and curriculum designers reflecting upon their pedagogical choices and use as feedback for future students. Educators can also use this document to initiate dialogue on a learner’s conception of the curriculum and if necessary, address misconceptions of the curriculum. Acting in a socio-constructivist manner, the educator or accompaniment provider can help learners apply ideas from a curriculum working beyond and through conflict to demonstrate change. This change can be recorded in a variety of formats using portfolios. Whether one uses a “before” and “after” format (perhaps as graphics or screenshots) or records change in more of a gradual (perhaps blogging or narrative) manner, portfolios offer a unique opportunity to record a snapshot of change occurring. Fuller’s Concerns Based Adoption Model with three stages of concern could provide an excellent format for a blog or portfolio. Rarely, are students given the choice in curriculum and so this opportunity to voice their likes and dislikes (traditionally afforded to teacher) may not be appropriate to students. However, some degree of student choice and an emphasis on how new ways of thinking and knowledge impact a student’s view of the world is definitely worthy of representation in a blog or portfolio.

Sharing digital portfolios
A web-based format for sharing digital portfolios has many benefits. As prior mentioned, options to toggle the degree of sharing a learner’s progress outwards from the individual to a trusted individual, internally to completely public is an excellent opportunity. Digital Badging complements portfolios as another tools to aid curricular goals and encourage students to record their progress completing tasks for a specific curriculum or towards an individualized curriculum. The web-based nature of digital portfolios also allows learners the opportunity to showcase skills and projects created outside the classroom and specific tasks (The concomitant curriculum). Finally, portfolios are perfect for student led conference and could be done F2F or virtual. Speaking personally, I find that being asked to share my learning in presentation format or sharing with others forces me to engage and explore my learning in greater depth. In fact, curriculum designers and educators might showcase their ability to lead their students through a specific curriculum in their own teaching digital portfolio.

Conclusions
Digital portfolios can be an excellent expression of sound pedagogy and demonstrate a reconceptualized curriculum ignored in traditional curriculum based on products only. Learner must adopt a reflective stance especially when asked to blog or share a progression of learning (assessment AS learning) through a variety of mediums. They can be a powerful expression of an individual’s creativity, background, culture, heritage, perspective and most importantly provide a glimpse of learner’s internal curriculum and unique voice. More specifically, this intentional act of phenomenology by learners is applied directly to the curriculum as an expression of them undergoing changes. Educators and accompaniment providers have a unique opportunity to celebrate this individuality, and in terms of curriculum goals, identify misconceptions, engage in productive dialogue and suggest next steps in a learner’s Zone of Proximal Development. At its highest level, digital portfolios could be an expression of an individual in the act of “peak experience” as triggered by specific curriculum. For curriculum designers, accompaniment providers and educators, authentic portfolios provide insight into the individual who just “finished” the curriculum but also to the individual just “starting” the unit of study. What a powerful tool for change agents.

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Putting Students First: Using Learning Theories to update Projects and Spaces

Collaboration is often cited as a key 21st century skill yet students rarely get an opportunity to observe educators in the act of working together. In my role as a technology integration specialist, I consistently collaborate with other teachers, openly when possible, so students can observe and model. The creation of clear, transparent and shared projects between educators aids learning goals and student success. Add in access to creative, technological tools and students have powerful ingredients for learning. Shared objectives not only reinforce the work of a classroom teacher but also validate the learning from the student's perspective. They might say "this is important as we are exploring it in two different subjects, Information Technology and Social Studies (perhaps more!)" This cross-curricular and integrated approach has been a fundamental aspect of learning and progress in my classes, in computer labs or increasingly anywhere tablets (and wifi) take us. However, my recent thinking, research and discussions on learning theories have led me to acknowledge that much more is needed to put the learner first. How much can I “learn, unlearn and relearn” my approach? (Toffler 1970) More specific connections with learning theories and leveraging vital collaboration with the collective intelligence of peers and colleagues in my current course of study, would improve learning and teaching in my learning environment. This “levelling up” approach has been applied directly to my current and future curriculum and project planning with students.

"Upgrading content requires deliberate provocation…what content should be kept,…cut,…created." (Jacobs 2010) Using experiences with Grade Five students, I will explore benefits of current approaches and leverage established and evolving learning theories, specifically humanism, cognitivism, behaviorism and constructivism in order to upgrade the learning environment for my students.

In the third term of Grade Five, students are often expected to more formally present a researched topic in Social Studies. Taking the pre-2013 revision of the Ontario Social Studies curriculum as a guide, Ancient China was the topic and students were assigned to research martial arts, food, clothing etc. Students were then asked to present their discoveries. When critically examining this project from a humanist lens, it is clear the students might have to “manufacture” their connections to topic, especially when they are assigned by the teacher. Yet connection with the material was a vital assessed element as manifested through enthusiasm, performance and creativity. In fact, much effort was made for teachers to find the right topic to fit specific students with understandably mixed results. These are clear signs that although assigned presentations were appropriate for meeting curricular goals, some tweaking and updating would be necessary to engage students from a humanist perspective. In fairness, our curricular documentation has reflected this change in the 2013 revision with an emphasis on an inquiry-based learning model where students are encouraged to ask questions and research using a variety of sources (primary, secondary etc.) and assumingly leverage new web-based search tools when appropriate.

From a behaviourist perspective, students were encouraged by a secure environment and often felt safe and supported by a variety of educators, peers and parents. Not surprisingly, students loved showing martial arts movies, dressing in beautiful silk and eating Chinese delicacies too. At times, students would use handouts with crosswords, games, stories and other techniques. We often used presentation tools on the computer...
From a cognitivist perspective, this project has challenges as students are assessed on their performance of their research rather than emphasizing a more gradual accumulation of knowledge, thinking skills, organization, project management or even collaboration. They could also be much more potential for input upon the accumulated scholarship or collective intelligence on a particular topic. In addition, this accumulation only built upon prior research skills (in Grade Four) and towards skill development for future research (Grade Six). In practice, projects were often discarded at the end of the year with little option for retrieval beyond an occasional video recording. Perhaps its place in a portfolio, (digital I would suggest) would add retrieval options, give more clues to thinking processes, knowledge acquisition, accumulation and assimilation. Assessment based on the performance/product alone would give educators less data than a performance combined with analysis of the process through documents like a portfolio most importantly accompanied by comments on the materials. Ideally, this might provide clues to a student’s metacognition and perspective. In fact, Piaget might see this project as more about accepting the research of others rather than “…creating men and women who are capable of doing new things, not simply repeating what other generations have done; men and women who are creative, inventive and discoverers, who can be critical and verify.” (Piaget, 1952)

From a constructivist approach, our presenter’s performance and ability to engage the students would be based in their “radical constructivism” as suggested by Glaserfeld. In other words, students would be more interested when they can construct meaning to the material with their own inquiries. Their ability to accommodate and accumulate puts much pressure on the student to construct and present the materials in an appealing, thought provoking and simulating manner. In fairness, much scaffolding, support and guidance for this was provided by a variety of educators. In fact, students were encouraged to be creative could build or construct their presentation in any manner (i.e. story, drama, multimedia presentation, game, demonstration, samples etc.) However, perhaps a more inquiry-based model is more student centered and would be better supported by constructivist theory.

Our latest project with Grade Five students is less performance based and provide a more opportunities supported by a variety of learning theories and approaches. This “leveling up” or upgrade to the curriculum allows students more choice (Humanist), while maintaining a consistent level of encouragement through a supportive environment (Behaviorist), provides an emphasis on the analysis of thinking skills in both the process and product (cognitivist) and finally, allows students to create and construct their own meaning and learning (constructivist). Finally, this new approach has the potential to tap into the collective intelligence of our class of digital experts, online sources and eventually when comfortable connect (connectivism) with others.

In specific, students were asked to create their own country after learning and profiling elements of the Canadian Federal government as an observable example. The key components were a “thought book” (sample) and a website creation tool (Google Sites). Unlike the prior individual project, students worked in pairs to create their My Country web pages as emphasis on social learning would also benefit students as they can help and aid each other when needed. “Hence, the principle and method of ICT integration in education is as follows: ICT is a means to organize paired interactions in the problem solving process as well as a means of cooperative educational activities in the classroom (teacher – student – group of students).” (Kalas 2010)

Each team was asked to profile their own country based on the criteria from their research and their own creativity and imagination. Scaffolding on using the technology to create pages was provided by videos (YouTube playlist), links, resources and students were encouraged to work collaboratively. Time was spent encouraging and modelling good collaboration as mentioned above and has foundation in Bandura’s social learning theory. Creating a the videos worked well as an opportunity for students to work within their zone of proximal development (ZPD) as students could watch, pause, rewind and play steps to complete their objective like changing the theme or adding images and links. In addition, teacher-led mini lessons or collaborations with supportive peers aided students to progress in their ZPD. The assessment process was changed from an emphasis on a final performance/presentation towards a gradual process enhanced by technology options like “revision history” and practices like “check ins” to monitor students progress.

In addition, students were awarded badges (my list) rather than marks based on their creations and these badges were awarded throughout the process than at the end (perhaps too late!) Probably the most exciting element was the opportunity for the students to inspired (and potentially create) badges of their very own based in their interest, achievements and ideas. This appeals from both a behaviorist (“I’ll have that badge I created please”) and humanist perspective (I have designed success myself through the creation of my own badge. Here is my conversation with a student (video only viewable by FDJ) and is a screencast in student-inspired badges. Based on this conversation and observation of him leads me to believe that he and his partner is demonstrating Csikszentmihalyi’s “flow” when working on this project. Finally, The “final” product being web-based is easily archived, shared and retrieved as both an exemplary for next year’s students and as part of a digital portfolio for the student.
Overall, a reimagining of all our projects and activities through the lens of all learning theories suggested that the learner is at the center rather than the curriculum content. The learner is supported by collaboration from a number of sources including a dedicated partner, educators in a variety of disciplines, other supportive peers, links to learning materials online and specific step-by-step screencasting videos for modelling. In addition, the opportunity in this example project encourages students to be creative on their web design while demonstrating necessary social studies learning goals. Accessing this project online through access to a lab, tablets in the classroom and even at home provides opportunity for anytime tinkering, iterating and creating. However, applying this example further and situated in learning space dedicated to building and construction could be even more powerful for learners. Being surrounded by the “buzz” of creative individuals in the act “flow” no doubt helps too. In fact, here are no limit to the possibilities for this project to include a variety of mediums including digital (paint and sketching (i.e. Flags), audio recordings (national anthem), animations (promoting the country, video, incorporation of web gadgets (a calendar of holidays), even programming through applications like Scratch (a web based games about the country) to Papert’s programmable drawing in Logo. Also physical creative mediums like painting, building with wood, plastics should not be ignored as they can be easily added to the web space through embedded video or photo. Finally, digital to physical mediums like 3-D printers or performing robots provide a new medium for learning. In short, our learning theories tell us that creative learner-centric activities in well designed spaces like makerspaces provide students with the opportunity to self-actualize.

Sources

Mihaly Csikszentmihalyi:. TED talk. (Feb. 2014.) “Flow, the Secret to Happiness.”
http://www.ted.com/talks/mihaly_csikszentmihalyi_on_flow


The Ontario curriculum – Social Studies Grade 1 to 6 (2013 revised)


Tsu-Raun, Christian (Jan. 2014) Creating a Mini Maker Space


This new technology company aims at personalizing content for optimal learning. The platform monitors the student’s activity and uses the information to give the student the best personalized resources based on their level of performance. The technology also boasts integration among different disciplines creating a more comprehensive set of resources that interact with one another. Knewton grows more intuitive the more the student uses the software. It can follow a student through their entire education career.

technology of developmental education, which focuses on the way of learning, which prompts the inclusion of internal mechanisms of personal development of students, their intellectual abilities. Significant features and features of the explanatory and illustrative teaching method. External signs This is a meta category for all categories of educational technologies, i.e. learning and teaching technologies, design tools, standards, etc. See also: Educational technology (an article that provides an introduction to the field). Educational technologies (an article that summarizes various educational technologies). Entries in the category “Technologies” (most technologies used in education are not educational technologies!)

Subcategories.

This category has the following 22 subcategories, out of 22 total. A.