

Technology and Industrial Education: Exploring How to Motivate Digital Natives to
Engage in Hands-on Learning

by

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Bachelor of Education, University of British Columbia, 2005

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Supervisory Committee

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Abstract

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This project is an exploration into the use of digital devices to motivate technology education students to want to be more engaged in their hands-on project/process work in the classroom, or shop. Inspired by the words of Prensky (2001) I wanted to inquire how to best reach these “Digital Natives”. The goal of my project was to explore the creation of a website where students, parents and the school community can not only visit, but also interact and take part in discussions in order to share and celebrate what students are learning in shop class. Throughout this process, I was encouraged at social media’s role in becoming a mediator between teacher, student and device.

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Chapter 1: Introduction

The police officer asked me, “so...what are you going to school for?”

I would regularly sit there while my wife worked her morning shift taking orders, making drinks and pouring coffee at a busy Starbucks. I would be nestled into the comfy chair in the corner by the windows flipping through Saturday’s Vancouver Sun for hours. During this time, I would inevitably meet many characters from the community and we would eventually engage in conversation. Sometimes the conversations would be meaningful and life-changing.

He was on duty and came in for a coffee...or maybe it was for some respite from the mean streets, battling gangs, drugs and the underbelly of society. Unlike teachers, police officers rarely seem to discuss their day-to-day activities, leaving room for the imagination to wander.

He knew Eden from his visits and eventually, by circumstance, I was introduced to him. When he asked me the question, I answered it as I had so many times before. “I’m going to be a teacher.” This response was usually followed by another question; “what do you want to teach?”

My father was a Physical Education teacher, so obviously I thought I should become one too. He loved his job and often bragged jovially about how “he couldn’t believe they pay me for this!” He loved exercise and this job suited him perfectly. He would either run or bike to school, take his students on runs, play games, and then return home at the end of the day by the other mode of transportation that took him there in the morning; a run or bike ride.

Shortly after high school I enrolled at what is now the University of the Fraser Valley and registered in various courses focussing my studies in Kinesiology. Looking back, this was one of many poor decisions on my part...I did not enjoy the structure of the science curriculum, was not a competitive person and most definitely was not addicted to exercise...I was a poor candidate for a life of Physical Education teaching. Through this realization, which was prompted by poor grades, many dropped courses and years of sampling the gamut of course offerings. I eventually focussed more on my other career; working in the hospitality industry. I loved working in restaurants...the people, noise and busyness made the shifts go by quickly and I seemed to really thrive in such a social environment. Looking back, this is very close to the environment I work in now!

As I explained the various courses I had taken, we talked about what I liked to do in my spare time; what made me happy. I explained that I liked to work with my hands on things, fixing, building and making. He asked if I had ever considered becoming a shop teacher and suggested I visited his friend who taught at a local high school to learn about a program he took at BCIT and UBC. This began the journey to where I am now, a shop teacher of eight years in Campbell River, teaching mostly Woodwork/Carpentry to students in grades nine through twelve.

My educational philosophy is deeply rooted in a belief that while subject matter and content delivery are important, some of the most important goals of a teacher are those that are much harder to pinpoint. I find my day-to-day goals involve helping those students that are ready to learn by attempting to pass on my passion for learning by doing with our hands, tools machines. What hopefully results is a contagious environment of learning through experimentation and project work.

I teach in a busy, full, noisy and dusty woodworking shop. My classes are often contain up to 29-30 students of various abilities and needs in a shop designed for 24 at most.

These challenges cause one to re-evaluate what they are teaching goals are and how they are going to achieve them. I am starting to realize that not all students are taking the course to build their skills in Carpentry and Joinery. Some do, but most want a fun course where they aren't situated in a desk and are able to be mobile, use their hands and build things. Others just want an easy place to hide out and receive an easy credit. Some haven't the chosen the course at all, but have been programmed in but their counsellor for various reasons. Others perhaps just want a place to feel safe. Besides keeping students safe from themselves, one of the biggest hurdles is connecting with each student and their variety of needs and skills they bring with them. The school year usually starts out quite organized and structured with safety lessons, demonstrations and tests before entering the shop. Once work starts on tools and machines, students work through the "proving grounds" of mandatory projects. If, and when completed, students are able to research, design and build their own projects.

Where things break down is keeping students motivated day to day and not wanting to pull their phones and visit with each other instead. I would love to see how the technology in their hands could be used to increase their levels of understanding in the shop! It is these issues that I will base my inquiry around and find out what can be done to attempt to increase motivation, which should in turn increase student learning.

I have been exploring the idea of making some lessons available online. During class time students are at various stages of their projects. My teaching seems to happen to a small group of students at a time. If I could make lessons available online via YouTube,

perhaps students could watch the lessons and gain some understanding of the procedure and be able to set the machine up for a process on their own. This would save me time, and increase the learning that occurs.

Chapter 2: Literature Review

One of the biggest stumbling blocks in a “hands-on” classroom or “shop” environment is the pervasiveness of technology in the hands of the students we teach. When used correctly, these tools can be used for research and learning, but when used without restraint, can end up being used mostly for social communication and entertainment. Teachers have an obligation to develop and teach good habits of technology use in their classroom and should be informed of the research regarding this new generation of student, sometimes known as, “millennials”, the “net-generation”, or “digital natives”.

Web 2.0

In order to understand how to reach students that seem to live their lives online, we must look at the research around this cultural shift. Web 2.0 describes this evolution of the internet and how it has shifted from an information source to a more collaborative, social meeting area.

Dohn (2009) describes it as “...activities characterized by most or all of the following:

- Collaboration and/or distributed authorship
- Active, open-access, “bottom-up” participation and interactive multi-way communication
- Continuous production, reproduction, and transformation of material in use and reuse across contexts
- Openness of content, renunciation of copyright, distributed ownership
- Lack of finality, “awareness-in-practice” of the “open-endedness” of the activity
- Taking place on the WWW, or the large extent utilizing Web-mediated resources and activities (p. 345)

Throughout the article, Web 2.0 is described as an upgrade from the original world-wide-web; Web 1.0. Rather than being a tools used for gathering information, it shifts to more of a participatory platform that many users can be part of.

Digital Native

Mark Prensky (2001) writes:

Today's students – K through college – represent the first generations to grow up with this new technology. They have spent their entire lives surrounded by and using computers, videogames, digital music players, video cams, cell phones and all other toys and tools of the digital age. Today's average college grads have spent less than 5,000 hours of their lives reading, but over 10,000 hours of their lives playing video games (not to mention 20,000 hours of their lives watching TV). Computer games, email, cell phones and instant messaging are integral parts of their lives. (p. 1)

He argues that there is currently a shift taking place within the clientele of our educational system. Surprisingly, he first coined the now academically popular terms “Digital Natives” and “Digital Immigrants” in 2001. “Today's students are no longer the people our educational system was designed to teach.” This short but concise article, written almost fourteen years ago seems as relevant today as it was the day it was written. He informs the reader that the students we teach no longer live in the same world that we (digital immigrants) were educated in and therefore we must adjust our delivery methods accordingly. They have arrived in the digital age and therefore require different methods of teaching. “...the single biggest problem facing education today is that our Digital Immigrant instructors, who speak an outdated language (that of the pre-digital age), are struggling to teach a population that speaks an entirely new language.” (p. 2)

I appreciated his pointedness regarding the issue, but also that he offered real, usable solutions to teachers in helping remedy this disconnect. He suggests that teachers must meet students in their situation and design curriculum with this in mind. An example of

this is creating game-based learning activities to mimic students' current mindsets. "We need to invent Digital Native methodologies for all subjects, at all levels, using our students to guide us."

I did question the idea of Prensky referring to his "Monkey Wrench" software, which is used to train engineers CAD skills using first person type games. At first it seemed as though it was a personal plug for his company, but it could also be seen as an example of "putting his money where his mouth is" instead.

Not all have agreed with Prensky's outspoken article.

Sue Bennett (2011) states:

Closer examination of Prensky's arguments, particularly in his influential 2001 paper, reveals little in way of evidence to substantiate his claims, however. He relies on anecdotes, conjecture and speculation. Nonetheless his ideas have often been uncritically repeated and cited as if fact. (p. 3)

Throughout her research paper, Bennett (2011) is able to clearly and concisely point out holes in Prensky's original publication on digital natives to the reader, but at the same time is able to fairly highlight truths in the article too and goes on to explain how it has created some debate and dialogue to further research. "In recent years Prensky (2009) has also seemed to resile from his earlier sharp distinctions, praising rather than criticizing the role of the teacher. Nevertheless the original divisive idea remains potent." (p. 4)

...the concern inspired exceeds the supporting evidence. Thus, the lack of evidence base and the extreme language used in arguments for the existence and importance of digital natives is consistent with a moral panic. This characterization is useful because it helps to explain how the idea gained such prominence on the basis of flimsy evidence. It also explains how the form for the debate stymied genuine academic discussion until the emergence of empirical evidence. (p. 9)

From this, Bennett is able to clearly relay to us, the reader, how Prensky coining the term “Digital Natives” along with his writings may not have been embraced academically, but became healthy fodder for debate and conversation.

Palfrey and Gasser (2011) repeat the same idea by stating:

For many parents and educators, the idea of “Digital Natives” resonates deeply...our decision was to apply our own research and the work of others to understand the salience of the term and to use it as a teaching and learning device, and to insert into the discourse insights about what sound social science is telling us. (p. 36)

The authors address how the initial stumbling block or “awkward term” of Digital Natives can be claimed, repaired and turned into a tool for more discussion. “...there is no moment in history that demarks an overnight change in how people use technology...there is no extent to which one could say all youth of recent generations use technology in advanced ways.” (p 37).

As teachers we would assume students, who spend most (or all) of their time with their technology very close to them, would be very adept at mastering its use, but to assume that would be incorrect. Throughout their article, Palfrey and Gasser (2011) do an excellent job at gently reminding us why these assumptions are false. They point out there are many variations of Digital Natives and Digital Immigrants. Not all immigrants are older, not all natives are young.

Many people born before 1980, too, are skilled at using new digital technologies, often more skilled in fact than their younger counterparts. The foreignness and bewilderment suggested by the term “Digital Immigrants,” the counterpart term to “Digital Natives” in its original formulation, is not an accurate or descriptive label for many adults. Many librarians, for instance, use technology just as effectively as any young person, or more so. (p. 39)

Reading this, allowed for some personal self-reflection, which enhanced my understanding further. The researchers point out, “As teachers, we need to be open-minded, seeking to find ways to limit behavior that constrains our students’ learning while building upon their creative and innovative learning practices.” (p. 44)

It seemed the more I read through critiques of the Digital Native term, the more my thinking changed. They summarize by saying, “Without the generational essentialism of employing...exhaustive categories, we observe that there is no gap between generations but rather gradients of different usage patterns.” (p. 40)

I appreciated Gasser and Palfrey’s attempts at leaving us with some positive hope at the end of the article. This seemed like a conscious nod to educators to ‘hold your heads high’ and keep doing the work you are doing. Through Web 2.0, students are actively engaged, “...shaping our--and their—culture. By and large, this practice is something that will be good for global society, if we embrace it in the right ways.” (p. 54)

Information Seeking

It could be assumed that because net-generation students are so connected to their devices they would be quite adept at information literacy. As a teacher of high school aged students I notice that this is not the case. Their devices seem to be used mainly for communication and entertainment. They have not been taught how to seek information effectively.

Eisenburg and Meyers discussed this phenomenon during their action research study conducted in 2008. They surveyed students using Personal Response Systems (PRS) finding:

“...that students appear to have ready access to the web, and show signs that they are more skeptical of digital media than educators and other scholars think they

are, this does not mean that they employ the best resources in their research, or that they are facile at retrieving a wide range of resource types.” (p. 12)

I thought the researchers’ use of PRS was useful. This method of data input by the students was simple, precise and instant. This use of technology may have helped by making it somewhat meaningful to the participants, which could in turn help with obtaining accurate data. “PRS has the ease and convenience of a web survey, but without the need for research sites to supply Internet access or computers” (Eisenburg & Meyers, 2008, p. 4).

The study found that students don’t value subscription databases or periodical literature due to misconception, underutilization and inadequate instruction (p. 12). Pleasantly, they offered a solution to this problem by suggesting that what is needed is a “...development of a culture of practitioner research, facilitated by collaborative partnerships with academics and the proliferation of research tools and instruments that can be quickly and easily incorporated into practice” (p. 12).

Their research was summed up by their statement, “...information literacy skills are becoming increasingly important to life-long learning and success. Students without such skills will be at a disadvantage: they will be unprepared to participate in the media-rich culture that pervades our personal and professional lives” (p. 13).

Chapter 3: Exploring How to Motivate Digital Natives to Engage in Hands-on Learning

The curriculum of shop class has not changed much in many decades, but its clientele has. As society has developed, Digital Natives' (Prensky, 2001) needs and learning styles have also evolved. As Educators, we must question whether we are doing all we can to reach students most effectively.

Why I Love Teaching Shop

For the last eight years I been fortunate to have had the opportunity to teach students the joys of working with hand and power tools in the woodworking shop. Here they use traditional joinery methods to create simple, functional cabinetmaking projects from local woods that may last their lifetime and beyond. Prior to joining this profession, I would not have considered myself a woodworker, but merely somebody who found pleasure working with their hands, creating, maintaining and repairing the everyday items around me. When I arrived at BCIT for my technical training I was immersed in technology education but was taught many disciplines and not able to focus on one.

When I was hired as a Woodwork/Carpentry teacher I had the opportunity to focus and learn in a very meaningful way both constructivist and constructionist (Papert as cited in Blickstein, 2013). While I was able to draw on the knowledge of fellow teachers for knowledge on classroom management, lesson and project ideas the majority of learning was self-directed as I searched for information on the intricacies of the various machines and tools in the woodworking shop including their proper set up, maintenance, safety and use.

Papert (as cited in Blickstein, 2013) wrote:

Constructionism shares constructivism's connotation of learning as 'building knowledge structures' irrespective of the circumstances of the learning. It then adds the idea that this happens especially felicitously in a context where the learner is consciously engaged in constructing a public entity, whether it's a sand castle on the beach or a theory of the universe (as cited in Blikstein, 2013).

I joined many woodworking forums, reading and participating in conversations and watched hours of YouTube videos. Fortunately it seems people have an inherent desire to share their knowledge with others through these and other mediums on the internet. Dohn (2009) describes this change as Web 2.0 where there is "...participation and interactive multi-way communication...continuous production, reproduction, and transformation of material in use and reuse across contexts." (p. 345) The web has evolved into a more participatory role and so must our teaching practices.

I have found myself constantly referring to the collective wisdom of others. Some of this has occurred face to face with mentor teachers but the majority seems to happen online in various types of forums. During the proposal for this project I questioned if students might also be able to harness these resources for their own inspiration and information?

Challenges and Changes

Shop class used to be a place, mostly for boys, to learn the necessary skills to help at home or on the farm; repair or build useful items; or get a job. Students usually came to these classes with some previously learned skills passed on to them from a family member. Today's children are living in a much different world. Priorities and needs have changed. Should we change too?

Keep shop going. The gymnasium, outdoor fields, computer labs, academic classrooms, music, foods and art rooms all have their challenges maximizing student engagement while learning. In the technology education workshop, we are fortunate to

be able to show students the joy of practical, meaningful work with their hands. It is a place where students develop problem solving skills; learn practical and creative techniques for working with wood; develop an appreciation for woodworking as a hobby; and sometimes orient themselves toward a well-paying carpentry career. Our challenge as teachers is to present a meaningful, rich, engaging and productive curriculum. If students can find meaning and success, they will participate willingly, under their own volition with intrinsic motivation. If there is no meaning or success, it is much more difficult for engagement to occur.

Our facilities are often large, busy, noisy environments full of students of various needs and abilities. When coupled with larger class sizes, teachers must remain vigilant in maintaining a positive working and learning atmosphere with their students. These students come to Tech Ed classes for a variety of reasons. Some want a creative outlet to build projects with their hands, others are looking for classes with less rigour, while some have no choice at all and are merely assigned to a course by a counsellor to fill an empty slot in their schedule. Teachers of elective classes recognize that there are many electives offered and struggle with the fact that if students do not enjoy their classes they will “vote with their feet” and enrolment will drop. If the number of available shop classes is diminished, then the shop teachers may be relegated to a mathematics or planning class instead of their chosen passion area!

An effective shop teacher is able to engage students while at the same time allowing them the freedom to achieve some personalized learning goals. This is a difficult balancing act as too much freedom with no direction can quickly lead to inactivity and disengagement. Each student’s personalized learning plan is different, but if the teacher

is directly involved and is the sole source of student motivation this process can be very difficult for the teacher to maintain day to day. Using the notion of the teacher as a facilitator rather than a keeper of all knowledge is a more sustainable model.

The distracted student. When students in schools are given a digital device coupled with unlimited wireless access, the end result is often distracted learning in the classroom. Many lack the development or maturity to self-regulate through good decision making. The attitudes and behaviours of the students when using these devices can be frustrating as they force teachers to compete for the students' attention, eroding effective learning time. The devices are small enough to go undetected and students are quite capable at using them discretely when they are motivated to communicate. They ring, ding, vibrate and light up when messages, pictures or updates from their social network come in, distracting the student.

This environment can create a power struggle between teacher and student which can quickly test a teacher's classroom management skills. Some teachers choose to refuse entry to devices in their rooms, creating rigorous rules and consequences if they are seen. Methods such as limiting wireless access or banning devices are sometimes employed, but these usually create larger divides between student and teacher. A more effective idea might be to ask students to silence devices or put them into airplane mode during lessons, turning off all notifications. However, these are all punitive or controlling management approaches aimed at compelling students' attention during class time. As an alternative, educators might seek ways to meet students where they are currently engaged...online with digital devices.

Adjusting to new realities. Almost all students carry mobile devices with them in school, and with some encouragement and direction might happily choose to use them to support their learning in class.

Research demonstrates that information literacy skills are becoming increasingly important to life-long learning and success. Students without such skills will be at a disadvantage; they will be unprepared to participate in the media-rich culture that pervades our personal and professional lives (Eisenburg & Meyers, 2008, p. 13).

Some teachers have chosen to embrace technology, realizing it is part of our society and that it should be effectively integrated into classroom learning.

Motivating students. “Because motivation leads to engagement, motivation is where teachers need to begin.” (Irvin, Meltzer & Dukes, 2007, p. 32). Therefore, if success leads to motivation, well planned activities that lead to success are also important. Having students use their devices to access information and inspiration in shop class may allow the two worlds (shop class and online) to come closer together - enhancing the on-task activity where students are motivated, working, learning and doing under their own volition. One of the biggest challenges educators face is motivating students to want to take part and complete learning tasks to meet goals in their educational outcomes. When students are motivated in any environment, real, meaningful learning seems to occur. In essence, students are happy and engaged because they are working on a task they want to be completing.

Researcher Melissa Cole (2009) defines engagement “as active participation in class and with the subject matter” (p. 143). Interestingly, not all students seem to need continual teacher motivation. A select group of students are able to maintain engagement

by their own intrinsic motivation. The question we must attempt to explore is how we (as teachers) can increase this highly subjective intrinsic motivation in our students.

Making shop work better. The secondary school technology education “shop” functions around a notion of producing and creating through hands-on learning. The space and curriculum invites alternate thinking and ways of doing. The focus of this project is to explore various methods of curriculum delivery with the main goal of empowering and inspiring digital natives to use their devices as a tool to access scaffolding designed to enhance hands-on learning.

My vision is to develop and host a class website to make available various forms of digital resources that students can access in and out of class and include a digital forum to support student sharing and collaboration. Parents will be notified via email and be encouraged to review and participate in discussion. My class website could then be shared first locally with colleagues (North Island) and then at a British Columbia Technology Education Association conference to encourage feedback/suggestions and more discussion.

School Shop Webpage

An online space. A website is being set up as an informational hub to allow the school community a starting point to access resources allowing them to engage online. This will hopefully motivate students to challenge themselves and complete higher-level hands-on work in the shop. The site will include safety videos and lessons, a blog to enhance communication as well as links to shop-based social media.

Each class will have its own main page with a collection of subpages containing information such as course outcomes and expectations – presented in a fun, positive

manner. Pictures and videos of exemplar projects and processes would be shown to allow students to see what could and would take place in the class. As I developed ideas for the website (Figure 1), I realized that it must remain simple and easy for students and parents to engage with. They must always be able to know where they are and be able to easily navigate through the site. The main home page will direct you on to the sub-pages (safety, about/staff, programs/classes, library). This section would contain an RSS feed of our Instagram page, and YouTube channel, and host shop class blog entries.

Just as in the classroom, the greatest emphasis must be on student safety. As I create the final version, I will be sure to make sure this is at the forefront of the site. The safety section will include general shop safety rules, safety videos and quizzes.

The About/Staff section will include general information, contact information and a picture of myself and colleagues who work in the shop.

In the Programs/Classes section, visitors will be able to find information on existing classes, course requirements, exemplar projects, course specific resources, and links to extra resources.

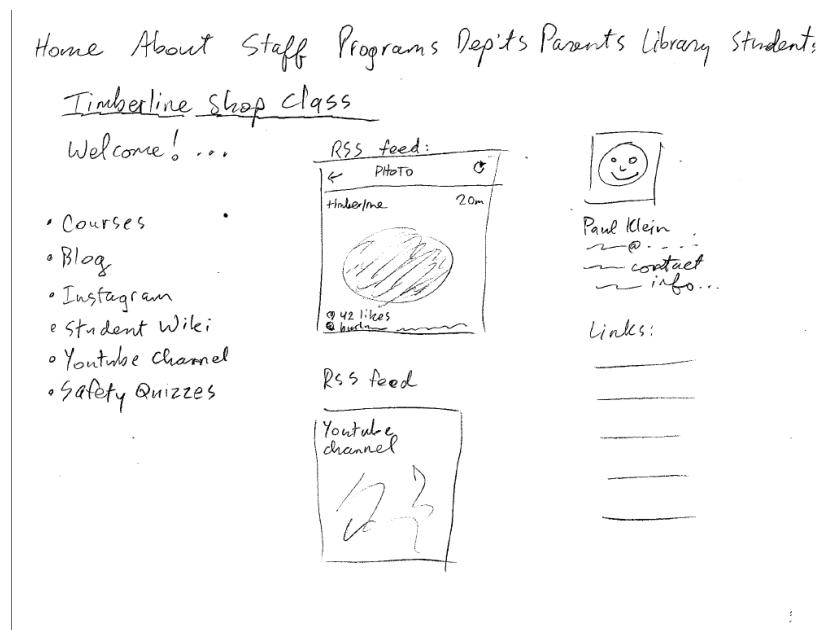


Figure 1. Early sketch of the Shop Class website home page.

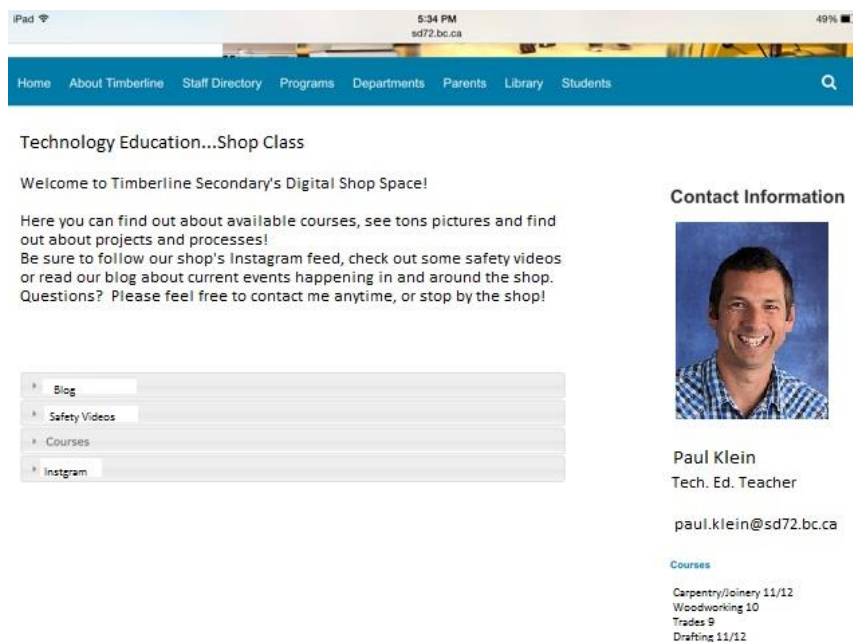


Figure 2. An early version of the Shop Class website home page.

Sharing examples and exemplars. As society changes, fewer students have the space or the need to work at home with family members outside of school time. This means

that students have less experience with working with their hands and don't come to shop classes with basic skills and knowledge of what good quality, or even minimally acceptable work looks like. If they have high quality examples hosted on the website, perhaps they will strive to match or better them, increasing their work output, and learning.

Students from current shop classes will be encouraged to upload photos of completed projects as well as take part in adding content with their smartphones. Digital Media from other parts of the school will be involved through collaboration creating and editing the material. The overall goal is to showcase what we do and gain inquiry and engagement with the entire school community; students, staff, administration and parents.

Safety first. As shop teachers, we must follow best practices to ensure student safety when working with tools and machinery in the shop. At minimum, we must demonstrate proper machine use, then test and record each student to ensure they have received and then understood the instruction on how to use it in the safest manner possible. We must then see the students use the machines and ensure they are performing the actions properly.

In the past, my method of instruction was to take the first week or more of class time to work through all the larger machines in the shop. An explanation and demonstration of each machine would be given, then students would be given a short quiz to work through. After answering difficult questions and marking the quizzes together, I would keep the paper copies of the tests for a record of their understanding.

Since classes are full of varied learners, it is difficult to know what to do with students that have already taken the tests the previous years, or even the previous semester. The

record keeping can get to be quite onerous and one could run in to difficulties discerning which students can opt-out of testing and which should be required to take it again. To solve this, I am creating a site where demonstration videos can be hosted and viewed by students on their own time if and when necessary. Face-to-face instruction would and must still occur for the majority of students as I introduce the machines, but having an alternate information source would allow students to receive instruction if they are late to enter the class, were absent the day a certain machine was covered, or would simply like to receive supplementary instruction. This system could also be quite useful for other adults such as Educational Assistants placed in the room who may not have received formal training in the shop, but require demonstration and testing before use of machines with students.

Moodle. Modular Object-Oriented Dynamic Learning Environment is an open-source learning platform that can be used to facilitate further online and face-to-face learning (“About Moodle”, 2015). Users can use it as a hosting facility for various types of online learning that will eventually be used to enhance face-to-face learning. I was able to participate in a professional development workshop on learning and creating Moodle spaces through the British Columbia Learning Network (BCLN). It is here that I started to see how I could develop a space where I could host videos, information and safety tests for student in the shop.

Video creation. Using my iPad to record and iMovie to edit, I have created some short videos of processes and safety instructions. Pictured above is a band-saw safety video which is hosted on our YouTube channel. I will create more instructional videos if necessary, but will also link to videos that others have shared for each of the major

machines in our wood shop in order to build up a resource of high quality, useful videos. Here I would be able to offer specific safety demonstrations for students who were not able to access them face to face. Supplementary videos would also be hosted here for students who wish more information.



Figure 3. Screenshot of a bandsaw safety video created with iMovie and hosted on Youtube.

Blog creation.

On the home page of the site I will create a blog to reach students as well as the larger school community. Current events happening in the shop such as projects and special events around the school will be covered. Our class is planning to build a shed for the school's courtyard garden next year and students will be invited to rotate through the assignment to be blog reporters covering the progress. This blog will also be a useful

tool for parents to connect with sporadically to check on the happenings in the shop. It may also encourage more useful dialogue between parents, teachers and students.

Shop class wiki.

Melissa Cole (2009) describes a Wiki as:

...An editable website that is created incrementally by visitors working collaboratively. The differentiating factor...is that users become publishers rather than merely consumers of information. They are able to combine, annotate and edit existing material in such a way that new content is created and used in a partnership with others. (p. 142)

Students will take part in maintaining a “Shop Class Wiki.” Included here would be techniques and terms that we use in the shop and the students would define them, adding text and pictures to each. This would allow learners to be active participants, constructing their own knowledge together. Students, working in pairs or groups, will be choose from a short list of topics and challenged to create a useful entry. This is not an item they can produce quickly and hand in. They should plan to revise it until it is an acceptable resource for the class website.

Instagram social media page.

As can be seen in Figure 3, I have used my Instagram account to host pictures of projects and processes for students, the school community and the larger woodworking community and will be setting up a class specific account to further support communication.



Figure 4. Sample Instagram posting.

So much of what we do in the school and especially the shop is behind closed doors with the only participants being myself and the students in the class. Other students, teachers, administrators and parents have little knowledge of what happens day-to-day. Instagram is an image-based social media program where users can upload an approved image or short video through their smartphones to their page. In order to educate students on what is appropriate, we will discuss proposed posts together to ensure they are suitable for the school site. Students and parents will be encouraged to be “followers”

and seeing the image will then be able to comment on it or “like” it. I chose to use Instagram over other social media platforms such as Facebook, as it is simply picture and video based and focuses less on relationships with existing friends and more on projects, processes and products.

Useful dialogue will likely occur through basic questioning on technical aspects, promoting further student inquiry and enhance understanding. A simple ‘thumbs-up’ or positive comment can boost student morale, again, leading to further engagement. Instagram has a huge following in all genres world-wide, but also seems to work especially well for hands-on activities. Reading comments makes one realize how many people pursue or desire to pursue these activities. Using the hashtags “#woodwork” or “#woodturning” I have learned about techniques, gained project ideas and formed connections with woodworkers around the world.

Privacy concerns are easily mitigated by communicating the district acceptable use policy rules – e.g., sharing pictures of students’ faces only with permission or only using first names. A “private” account can also be set up to approve followers if necessary.

Once the class Instagram account is set up, students will post images or videos of processes as projects are created, to share with the community for feedback and reflection. I will act as an intermediary, ensuring appropriate material is posted.

As projects are created, students use many machines and processes as they build. If some of these could be showcased to show the community how things are created this would virtually open the doors to the shop allowing others to view what we do and how we do it. When finished, projects could also be offered for sale to gain some

entrepreneurial skills. All of this would enhance our programs and further validate what we do.

RSS feed.

A RSS (Really Simple Syndication) feed acts as a news feed to any website or blog, allowing content to be updated automatically. The class Instagram account will be integrated into our website in order to link to and display updated content from our Instagram page directly. As pictures and short videos are added to our Instagram page, these images will be shared on the shop website. This will enable more viewership allowing more exposure to what is currently taking place in the shop classroom. As the space evolves, more RSS feeds, such as a link to a Youtube channel might be added.

Ongoing Development and Refinement

I don't expect this website to solve all of the problems of student disengagement in shop class, but I am certain it will help to improve communication and raise interest in what we are doing. Hopefully it will intrinsically motivate those that are receptive; justifying the use and need for digital devices in classes. The website will enrich our curriculum by adding structure; it will allow us to share successes more immediately and broadly; it will give students (and parents) ongoing access to course outlines and other resources that previously never made it past the bottom of the backpack; and it will introduce productive, shop-related digital activities; all in an accessible, central learning location. Whether we are keen on the label "digital native" or not, these devices are here to stay and we must embrace them and make every effort to have them make our learning environments better.

Chapter 4: Comprehensive Exam

Summary

When I decided to pursue a Master's degree, I knew that I wanted my courses and final project to be relevant to the hands-on work I do every day with students in the shop. Here, there are no seats, desks or whiteboards, only workbenches, machines and tools. As it is much different than a typical classroom, I first pictured myself taking on the construction of a large-scale, challenging piece such as a cedar strip boat. In doing this I would be able to develop my skills in boatbuilding in order to be able to share with my students later. Another thought was to develop an exciting new student project, or perhaps, just reorganize the existing layout of the shop to make it more accessible for learning. At some point I realized that I should really focus on what seemed to me to be the biggest barrier to student learning; their sometimes inappropriate use of technology in the shop.

It seems in my experience, in shop class there is always a certain percentage of students who lack the ambition or intrinsic motivation to move themselves from social time with technology and/or friends into hands-on work time with their class projects. In shop many activities and processes are occurring simultaneously – some with my direct supervision, some without. I usually find myself occupied with the students who are ready and currently engaged in what they were working on. However, when I recognize that there are disengaged students I must remove myself from working with the engaged students to try and motivate this smaller group of students to start working.

One day, I started posting images of segmented woodturning projects students I had completed on my Instagram page. A short while later, students, friends and others were

commenting in person and online with feedback on the images. I noticed as I graded projects and commented on how well done it was, students would ask that I put it on the Instagram page. I started to realize that this form of technology could be used as a tool to engage and offer motivation for hands-on work from students where they already are...online. Working through our EDCI 591 (Technology as a Pedagogical Tool) course with Tim, we were made aware of technology's role in student learning. As we evolve to a life with accessible technology, we must also change our curriculum to reach these Digital Natives, our students.

What Has Changed?

As a result of my studies I believe my ways of doing and making meaning have changed subtly. The stories from my teachers, colleagues, and readings have allowed me to pause and become more reflective. One of the biggest surprises was the amount I learned about Aboriginal culture through our Indigenous Pedagogies class. As a person who was born in Campbell River, I was embarrassed to admit I had not visited the new museum, the location of our summer classes. I realize that as I visited here and the Big House my perception changed through opening my eyes to allow me to realize that my way of learning is in some ways similar but in many ways different than the Aboriginal ways of Learning. Learning at the museum, surrounded by First Nations culture, allowed us to be immersed in a surrounding which helped begin this change. I found myself asking questions to friends and family about what our perceived notions on First Nations culture are and why they are this way. As I learned about the Wild Woman of the Woods I realized it was the character that my father had carved a mask from many years ago when he was working as a commercial fisherman on a First Nations boat. Moments like

this allowed me to reflect and question my ways of thinking and how my upbringing has affected this. Through this, I know I have changed the way I approach my role as a teacher and how I interact with students in a positive way.

I realized there was more I could be doing to add First Nations culture to my teaching. I networked with a local elder and found that he wanted to show young people how to make drums, but had no way to make the hoops. Through my learning with him and research online I found that students could possibly produce the hoops with our equipment in the shop as a class project. We first attempted steam bending the hoops with 1/8" laminations, but it proved to be too difficult to bend without snapping the wood. We settled on a non-traditional approach of making sixteen-sided segmented hoops with a spline reinforcement in the joints. The elder was able to successfully run two drum-making workshops and we were able to expand our curriculum.

Throughout our EDCI 591 (Technology a Pedagogical Tool) class, I found myself comforted that my belief in using technology in the shop was justified. In my short career I have come across colleagues in favour and against the integration of technology in school. Some have chosen to embrace it; some have created barriers to its use in class. Because of this, I would sometimes question my own belief and wondered why I allowed its use in class at times and not in others. I especially enjoyed exploring the use iPads in the classroom and learning about the Explain Everything software. This easy way of using various forms of media to explain process will be great for my quest in creating a useful website that will hopefully engage students.

Professional Impacts

I feel that my graduate experience will give my career some “legs” by allowing me to draw on what I’ve learned through my studies for inspiration constantly as I continue to revise my role as a teacher. The ability to read and sift through academic journals will be useful in continuing my learning experiences as our curriculum evolves. The coursework has given my career more depth and I feel I may have more to offer as an educator. Although I cannot see the future, perhaps I will not always be a fulltime classroom teacher. I might instead find myself as an advocate for innovative technology use in our schools or finding ways to promote skilled trades to a wider variety of students as a viable post-secondary alternative.

I have been inspired by both my professors and my cohort colleagues. I am a very social person and because of this, really embraced the camaraderie of the program. I loved taking on something challenging and being able to take part as a group. Through this experience I was able to get to know fellow teachers better and learn more about their teaching attributes. In doing this, I was able to draw on them for knowledge, ideas and motivation. I know that I will continue to be able to do so.

As I was researching opportunities for graduate studies, I looked at universities closer to home as well as out of province and country. Looking back on my experience I feel fortunate to have not been forced leave family. Not only was I able to stay close to home, I have a cohort of colleagues who have had similar experiences that we will be able to share for the rest of our careers together. The closeness of our group is an immense benefit for our entire school district. We have bonded and formed special relationships that will last through our entire careers...many years to come.

Recommendations

My first recommendation is to just “try” integrating technology into our shops. As teachers, there seems to be a fear of technology, that it is too difficult, time consuming or just changes too quickly for us to be able to keep up with it. When this happens we quickly give up or avoid attempting to use new technology and don’t develop our knowledge and skills. When students see us attempting to meet them where they are, embracing technology, they are receptive to what we have to relay to them. If we struggle, they often are eager to help us along the way. Perhaps have students BYOD (Bring Your Own Device), pair up and create a short video slideshow on a certain process they encounter while building their project.

My second recommendation is to be inquisitive and reflective. What is working in your current practice? What needs refining? How can students be motivated through technology? I have found that as we inquire through reading and asking questions, we become engaged in a topic. As I have mentioned in my project, there are many resources created by individuals who have the desire to share their knowledge with the online community in order to spread the love of what they do. I have found this has motivated me in my development as I have been able to “lean” on them, asking questions, getting feedback and learning. They, in turn, are rewarded by feeling that their work is worthwhile to others. It is important to ask our students questions to judge what they will be receptive to. Imagine if we spend time creating a Facebook page for them to access, but don’t realize that fewer students are using this form of social media. If we can remain inquisitive, we take on a role-reversal from teacher, to student. I think this is worthwhile as it can cause more reflection and refinement in our practices.

The third recommendation I'd like to present is to be involved with your school and district's technology's use and implementation. This may mean speaking at a staff meeting, networking with other like-minded teachers or joining a technology specific committee at the school or district level. I have found that by taking part in this, one is able to acquire the necessary hardware such as a projector, tablet or computers through the school's funding. Recently, after lobbying our school district for new funding for our programs, they decided to invest in upgrading some of our outdated shop equipment. We were able to purchase 3d printers and CNC routers which will enhance what we do and allow us to make our teaching more relevant to what they will encounter outside our walls.

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