Implementing Indigenous Education with Technology Education in British Columbia

by

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Bachelor of Education, University of British Columbia, 2016

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Abstract

This project begins by outlining why Indigenous education and technology education need to be more closely connected. It begins by exploring a framework which explains the connections between the First People's Principles of Learning and social constructivism theory. Indigenous education is explored touching on important topics, such as residential school history, reconciliation, racism, and decolonization. This topic leads into exploring Indigenous education, discussing why it is important and the challenges faced by educators when implementing it. The following section explores technology education by defining technology and technological interaction. These topics all come together to explore the intersections between Indigenous education with technology education. It then looks at how technology education can be viewed through a holistic lens by incorporating the self, family, community, land, spirits, and ancestors. Further, it explores generational roles and responsibilities and sacred knowledge and its connections to the classroom/shop.

The projects main focus is the creation of a website where technology education teachers in BC (and elsewhere) can go to find resources and classroom approaches with an Indigenous education focus which can be readily implemented for a technology education shop/classroom. Further, the website offers a template to follow so that educators can also submit their own lessons or projects to be shared with others. The focus is to help technology teachers address the large void often present in the technology education curriculum regarding Indigenous ways of knowing, being, and doing.

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Chapter One: Overview

Introduction

I would like to start by thanking the Coast Salish Peoples whose land I have lived on my entire life. I would specifically like to thank the Lekwungen/Songhees People whose land I currently live on, the T'Souke Nation who I work with and whose land I work on, and the Sc'ianew Beecher Bay and Pacheedhat Nuu-chah-nulth Peoples who I also work with. I intend to honor the sharing of land and resources by using my position as an educator to protect and share Indigenous knowledge and ways of knowing to the best of my abilities. As an Indigenous ally, I wish to create a safe classroom/shop for all students to learn to their greatest potential and guide them to their futures while connecting them with each other and the community, be that Elders, Knowledge Keepers, parents, businesses, or other community entities for the betterment of all.

Hych'ka Kleco Kleco Gilakas'la Marsee Thank you

As a non-Indigenous cis male of mainly Irish and English descent, the thought of working on a project focused on Indigenous education can feel a little daunting at times. There is a fear that I believe many non-Indigenous teachers initially have when addressing Indigenous education that you may unintentionally cause disrespect or share knowledge incorrectly. That fear is likely a correct one, but I believe it is my duty as an educator, an Indigenous ally, and a Canadian to address historical wrongs that have taken place and use my position, as best I can, to create a better future for my entire community. I may make mistakes, but I intend to learn from them and always strive to move towards a more empathetic and understanding future. I hope this project can be viewed as a piece of my commitment to ongoing growth as an ally and to building lasting relations with the Indigenous Peoples of the land where I live and work.

Why Indigenous Education and Technology Education?

I chose to investigate the implementation of Indigenous education into technology education because I, and other technology education teachers I have spoken with, have struggled with adapting and including Indigenous education in the technology classroom (woodwork, metalwork, drafting, automotive, electronics, robotics, etc.). To make matters worse, it can be difficult to track down resources as the intersection of Indigenous education and technology education is both generally under researched. To address this issue, I wish to create an online collection of resources to share with other technology education educators. My hope is that this website can work as a guide and living document to aid technology educators in adapting, including, and sharing Indigenous education within their classrooms and shops for the betterment of their students, school, and community.

Professional Journey and Relevance.

My first real introduction to the concept of Indigenous education was during my teacher education program at UBC. While there, students took multiple courses that briefly discussed the topic and one course which was specifically focused on Indigenous education. Regretfully, at the time I was skeptical of Indigenous education and its place in my future classroom/shop. I was not against Indigenous education, but I felt like it was not pertinent to me learning how to teach, an attitude I now regret. Adding to this misinformed belief was the fear of teaching a culture and skills outside of my understanding and knowledge base. I found Indigenous education extremely intimidating, to say the least. What I did not understand at the time is that Indigenous education is not separate from the current Canadian system.

As my classmates and I desired to “learn how to teach,” our instructors were no doubt frustrated at our lack of understanding of what exactly they were trying to teach us. I would later

come to understand that my teachers were trying to broaden the way I think beyond the teacher-centric education system I grew up with and to help me to pivot to a student focused teaching style. This approach to education could then open the doors to culturally responsive pedagogy which, in turn, opens the door to and inclusive classroom and the implementation of Indigenous education (Pete, 2018). By focusing on and positively reacting to my students' diverse needs and backgrounds, I have been able to make my classroom more than a place of learning. It is a place of community and comfort for students to express themselves beyond prescribed teacher centric lessons, projects, and prescribed outcomes.

When I began my journey to seriously begin implementing Indigenous education into my classroom/shop, I reached out to my technology education colleagues via a private Facebook group to ask them to share what they do in their classrooms and shops to address Indigenous education. I was disappointed with the response as only one teacher, out of a group of over 500, submitted a response of any substance. It was at this moment I realized that this was an area that needed attention, not just for my classroom, but for all technology education classrooms across British Columbia (BC).

Project and Goals

Current statistics show that there is work that needs to be done so that the BC education system can honour its agreements with Indigenous peoples. In BC, 74 percent of non-Indigenous students receive a Dogwood Diploma certifying their graduation as compared to the 52 percent of Indigenous students who meet the same outcome (BC Ministry of Education, 2018). Furthermore, only 33-35% of both Indigenous and non-Indigenous grade 12 students in BC feel that they are being taught about Indigenous peoples in Canada (BC Ministry of Education, 2018). This could be, as Donald (2009) suggests, that teachers find including Indigenous views difficult

and rely on the more comfortable stories of Canada that they already know. Furthermore, it requires teachers to challenge the core of their Western based institutions which provides them with their authority and position of privilege (Ahenakew, 2017). To address this issue Battiste (2013) asserts that educators have a social responsibility to decolonize themselves and recognize the damages of colonialism. This project is my way of attempting to do that very thing to better myself, my classroom, and my community.

The goal of this project is to address the disparity between Indigenous and non-Indigenous learners in BC by creating an online website that will act as a resource for technology educators to guide in implementing and intersecting Indigenous education with technology education classes and shops. The website will be broken down into several sections and present resources and examples, some created by outside entities and others created by the author for teacher use and adaptation. The goal is not to present a definitive model of intersecting Indigenous education with technology. Taking this approach would not meet the needs of most communities and create resources that would be inadequate and possibly even counterproductive. The resources created and presented should be used as guides for educators to implement in their classrooms/shops to meet their student and community needs. Educators will still be required to do the work of connecting with local Elders, Knowledge Keepers, parents, businesses, and students to create authentic lessons and connections.

Literature Search Methods

The preliminary keywords used in my search were *technology education, Indigenous education,* and *Aboriginal education*. Later the terms *STEM, science,* and *art,* which are slightly outside the initial scope, were added. Many of the articles found were not pertinent to my subject, but the ones that were aided in narrowing search terms, later adding the keywords

holistic, *sustainability*, *Indigenous knowledge*, *design*, and *community*. I used the University of Victoria databases and Google Scholar with the mentioned keywords aiming to find peer-reviewed resources that were not older than 5 years, meeting moderate success. After exploring the first few resources, I began to discover some influential authors and papers that were cited regularly by others which led me to search them out specifically. I would later add the search terms *decolonization* and *reconciliation* to narrow my search on specific topics once more. Searches for government legal documents and British Columbia mandated K-12 curriculum were found through using search terms specific to the document being searched for, i.e. *ADST curriculum*, via Google search engine.

Definition of Terms

These definitions are taken from the SABAR Key Terminology Guidebook for Reporting on Aboriginal Topics (2012):

Aboriginal: is an alternative collective name for Indigenous People

First Nation: are the predominant Indigenous peoples in Canada south of the Arctic Circle. The term is also used to describe a community, replacing the word "band."

Indian: is, in social contexts, an antiquated and inaccurate term for Indigenous Peoples who live on the land collectively known as Canada. It is a legal term in Canadian law and Indigenous Treaties in relation to the Indian Act of 1876. It will only be used in historical reference within this project.

Indigenous: is a collective name for the original peoples of North America and their descendants, including First Nations, Metis, and Inuit Peoples. The term is also used in an international context to describe the people who have occupied an area since time immemorial.

Inuit: Inuit are the Indigenous peoples of Arctic Canada. The word Inuit means "the people" in the Inuit language of Inuktut.

Métis: are people of mixed European and Indigenous ancestry. They have a unique culture that pulls from a range of ancestral origins.

Chapter Two: Theoretical Framework and Literature Review

Theoretical Framework

What we learn and how we know is based on multiple factors. If we are born in one part of the world, our family and community will teach us what skills and values are important to the people of that area. In another part of the world, those skills may be less useful or even irrelevant and would likely not be taught. We learn from the social structures and supports around us. Social constructivism theory builds on the belief that understanding and learning are inherently social (Palincsar, 1998). What we learn and know comes from our community. Further, the theory asserts that conceptual development requires tools and activities based in culture (Palinscar, 1998). Social constructivism theory intersects with the First Peoples Principles of Learning (FPPL), emphasizing community and intergenerationally focused learning (FNESC, 2011). The community demonstrates to learners what is important and together the community and learner form an agreed upon reality and knowledge.

The First Peoples Principles of Learning is used for this project as a framework for intersecting Indigenous education with technology education. The nine principles are as follows (FNESC, 2011):

1. Learning ultimately supports the well-being of the self, the family, the community, the land, the spirits, and the ancestors.
2. Learning is holistic, reflexive, reflective, experiential, and relational (focused on connectedness, on reciprocal relationships, and a sense of place).
3. Learning involves recognizing the consequences of one's actions.
4. Learning involves generational roles and responsibilities.
5. Learning recognizes the role of Indigenous knowledge.

6. Learning is embedded in memory, history, and story.
7. Learning involves patience and time.
8. Learning requires exploration of one's identity.
9. Learning involves recognizing that some knowledge is sacred and only shared with permission and/or in certain situations. (para 1)

The FPPL sets a framework for community connection but also embraces the holistic learning framework. Holistic education focuses beyond intellectual and cognitive development and extends its focus on physical, emotional, aesthetic, moral, and spiritual growth (Miller, 1998). The tenets of learning require the whole being to be fully realised. By using all a learner's ways of knowing, the learner can see new information and situations in a more complex and full light. In a sense, holistic learning and the FPPL set out to create whole human beings whose identities are not separated from one another.

Indigenous Education

Introduction to Indigenous Education

Cajete (2015) asserts that our lives are sustained by the land we live on and that we can learn by actively witnessing and participating in what the land has to offer. This relationship to the land is at the heart of Indigenous education (Cajete, 2015). The role of the teacher is taken on by the animals, plants, and landscapes (Marker, 2004). Everyday interactions with family, community, and environment are all teachers in the broad understanding of what Indigenous education is (Simpson, 2014). The world and the people we interact with are all educators which can teach us valuable lessons in ways that Canada's current mainstream education system is currently not capable of.

Around the world, Indigenous communities are currently taking actions which are causing a shift, demonstrating that Indigenous knowledge systems and ways of knowing are being recognized (Barnhardt & Kawagley, 2005). Both Indigenous peoples and many mainstream (Western) educational institutions are now recognizing Indigenous knowledge. This has given it a raised legitimacy to its social value and as a system of knowledge. It has also begun exposing Western prejudices that act against Indigenous knowledges (Battiste & Henderson, 2009). In Canadian education, there have been changes taking place. Indigenous education is becoming seen in the eyes of Canadian Educators as a legitimate educational method which could see a shift in how education is approached in the country. This literature review sets out to explore those changes and how they intersect with the technology education curriculum. It will explore the history of Indigenous education in Canada, delve into the current statistics outlining the struggles Indigenous people are currently experiencing in the British Columbian education system, and what Indigenous education's current framework looks like. Further, it will explore technology education in a contemporary lens, while defining what technology is.

The history of residential schools and reconciliation. When settlers began to colonize what would become Canada, there were numerous attempts to separate Indigenous peoples from the land and stifle their ways of living and knowing. Perhaps one of the most infamous of these attempts was residential and boarding schools for Indigenous children (*Truth and Reconciliation Commission of Canada*, 2015). The first residential school opened in 1831 and the last closed in 1996, serving more than 150,000 students. These schools took Indigenous, Inuit, and Metis children from their homes and attempted to erase their culture and replace it with a Eurocentric one (Smith, 2017).

Although residential schools have been abolished, there have been many lasting negative effects, including a disruption of ancestral traditions, of intergenerational socialization, and of land awareness which is compounded further by the current education systems which commodify the land. This means that modern education and society are affording less and less Indigenous people the chance to engage with the land, plants, and animals in similar ways that their ancestors would have. This loss could hurt their future as the land is important in Indigenous education (Cajete, 2015). Furthermore, the publication of Honouring the Truth, Reconciling for the Future: Summary of the Final Report of the Truth and Reconciliation Commission (TRC) of Canada (2015) has shown the cost that the residential school's assimilation policies have had on the individuals who were required to attend the institutions. It has damaged communities, weakened language and cultures, and caused a distrust of formal education systems by many Indigenous people. To further compound this, mainstream education has caused negative stereotypes to go unchecked among non-Indigenous Canadians (Truth and Reconciliation Commission of Canada, 2015). All these events and realities have coalesced to create a system and population that are hostile to Indigenous Peoples.

In 2006, the Indian Residential Schools Settlement Agreement (IRSSA) was reached, a discussion between representatives of former residential school students, the Assembly of First Nations and other Indigenous organizations, the involved churches, and the federal government. The IRSSA called for five outcomes (Northern Affairs Canada, 2019):

1. A common experience payment for loss of language and culture.
2. An independent assessment process for additional physical and sexual abuses.
3. Support for the Aboriginal Health Foundation.

4. Support for residential school commemoration activities.

5. The establishment of a Truth and Reconciliation Commission of Canada.

The IRSSA was followed in 2008 by a formal apology by the Prime Minister of Canada for Canada's role in the Canadian Residential School system (Macmath & Hall, 2018). The Truth and Reconciliation Commission was created as per the IRSSA and released its final report in 2015 featuring 94 Calls to Action of which three were specific to education in Canada. These include outcomes such as (TRC, 2015):

> **63.1** Creating curriculum and providing funding for important Indigenous issues to be implemented in K-12 classrooms.
>
> **63.3** Creating an environment for students promoting intercultural understanding, empathy, and respect.
>
> **63.4** Identifying teacher training regarding Indigenous education.

The TRC (2015) final report also stresses the importance of relationships, truth, healing, and justice with each other and the environment, all important themes within Indigenous education.

Meanwhile, Indigenous leaders of BC came together to give the First Nations Education Steering Committee (FNESC) a strong mandate to push for Indigenous education in BC, both off and on reserve. Several agreements with the BC government have been reached that recognize that education is pivotal to improving Indigenous peoples' lives in the province (Child, 2015). The agreements are:

- The New Relationship Agreement: Creates a relationship of reconciliation between the BC government and Indigenous peoples (Ministry of Aboriginal Relations and Reconciliation, 2005).

- The Transformative Change Accord: lays out a plan between the BC government and Indigenous peoples to address the economic and social gap of Indigenous peoples to other British Columbians (Province of British Columbia, 2005).
- The Tripartite Education Agreement of 2012: Is an agreement between FNESC, the Government of BC, and the Government of Canada outlining the goals of the three authorities and how they can work together to better serve Indigenous students in BC (BC Ministry of Education, 2018).

While these agreements were taking place, many educators and people interested in Indigenous education worked to make improvements to the current school system. For example, Child (2015) asserts:

- The creation and incorporation of courses such as BC First Nations Studies 12 in 1995 & 2006, English First Peoples 12 in 2008, and English First Peoples 10-11 in 2012 which implement the input of Indigenous educators and address both current and historical topics and themes using a BC lens.
- A mandated emphasis of various Indigenous traditions and histories in the K-12 curriculum.
- Creation and endorsement of Indigenous pedagogical resources for teacher and accurate learning resources for students.
- The endorsement of the First People Principles of Learning.

Yet, now in the present day and with these agreements in place, the inclusion of Indigenous knowledge in Canada's education systems has moved slowly. Current statistics show that there is

still more work to be done if the BC education system is to honour its agreements with Indigenous peoples (BC Ministry of Education, 2018).

Racism and decolonization. Historical goals of the Canadian government were to eliminate Indigenous people and their ways of knowing. Through these actions, racist ideals have continued to persist in Canadian society despite them being proven false. Colonialism holds power, voice, and legitimacy over anything deemed "other." This, in turn, has marginalized and de-legitimized Indigenous knowledge and languages, and racialized Indigenous identity (Battiste, 2013). In response, Battiste (2013) calls for decolonization, which aims to break down the colonial culture and examine Eurocentric beliefs of education, race narratives, and differing curricular approaches and pedagogy. She asserts that educators have a social responsibility to decolonize themselves and recognize the damages of colonialism. Decolonization hopes to address the assumptions which aid in maintaining the status quo of the mainstream classroom and disrupt long held norms to make room for diverse voices, perspectives, and objectives (Battiste, 2013; Wemigwans, 2018). By adopting a decolonizing mindset, educators begin the process of making their classrooms a safer space for all students.

The Canadian education system, both past and present, has attempted a forced assimilation of colonialist thinking and principles on Indigenous peoples, causing trauma on multiple generations. This violence has in turn contributed to high levels of suicide, substance abuse, incarcerations, children in foster care, and family violence in Indigenous homes and communities (Battiste, 2013). Other symptoms of racial oppression experienced by Indigenous Peoples are poverty, substandard housing, poor water access, lack of sanitation, health concerns, high-risk maternal care, birth defects, youth disabilities, children in care, unemployment, high stress levels, and low coping skills leading to trauma, violence, incarceration, and suicide

(Battiste, 2013). These symptoms of oppression continue due to the indifference of Canadians and the governments that represent them.

Race is a social construct. Battiste (2013) asserts race is a belief and social attitude and not based on the make-up of genetics or biology, such as eye colour. It is important that racism is confronted not only historically but also in the current contemporary contexts (Battiste, 2013). To confront racism, one must confront their potential positions of power and privilege which may not be immediately obvious to individuals benefitting from said racism. It is important to address issues of racism both within and outside the classroom. This will create a space for racialized students to feel safe, welcome, and better prepare them for learning by creating a positive community within the classroom.

To reach decolonization of education, curricular outcomes must address the indignities and tragedies imposed on Indigenous people through the past and current colonial education system. The decolonized education system must dismantle curricular knowledge choices, transforming education to focus on the contexts of people's lives, and on individualized learning (Battiste, 2013). These approaches will be instrumental in aiding the coming generations to rethink the colonialist mindset and confront the racism that has been integrated into Canadian society.

What is Indigenous education? To better prepare students, BC's Ministry of Education began in 2010 to reassess and change the provinces curriculum to focus on personalized learning and core competencies. In 2012, a Curriculum and Assessment Framework Advisory Group (formed the previous year) published the results of its task to create and receive feedback on the guiding principles for the curricular redesign. They concluded that the integration of Indigenous knowledge and world views in the new curriculum would be an important step to addressing

misunderstandings of Indigenous culture. This in turn would provide all BC students with a foundation for mutual understanding and respect of Indigenous peoples. (BC Ministry of Education, 2013).

The Advisory Group's findings recommended that curriculum writers should consider the FPPL and that the Ministry must ensure that Indigenous ways of knowing are properly respected in all curricula (BC Ministry of Education, 2012). The FPPL document's creation was orchestrated by FNESC who brought together a group made up of individuals from First Nations, public schools, and universities (FNESC, n.d.). These entities worked together with the mandate to design a supportive document to aid teachers as they create and implement curriculum. The FPPL has been found to be helpful, but there is still a need for strong examples outlining how to best implement them. Without strong examples, the new curriculum efforts may be a continuation of colonization rather than a real effort at reconciliation (Macmath & Hall, 2018). Battiste (2013) challenges teachers and politicians with the assertion that the integration of the new curriculum does not necessarily equal decolonization. She argues that the addition of Indigenous ways of knowing to fit current outcomes does not challenge colonial (Western) educational system, a construct made to impose on students, colonial identity, culture, and language (Battiste, 2013). The goal of this project is to directly address this call to action, to aid in the creation and curating of strong examples of Indigenous education material, and to aid in decolonizing the technology education classroom/shop.

Challenges. One of the greatest challenges of Indigenous education in BC is the vast differences in Indigenous peoples and cultures from place to place. A resource that has deep impact in one area may be completely disassociated with the people and community of another. One of the first steps educators and institutions should make when developing their curriculum is

to go to the local Indigenous nations themselves and build a relationship of trust and understanding (Association of Canadian Community Colleges, 2010). This could lead to a school culture of respect and representation shown through greetings, class activities, shared celebrations, publications, professional development, planning, in school representation, and a ready supply of resources (Toulouse, 2013).

In approaching implementation of Indigenous knowledge and ways of knowing in the public education system, Walker et al. (2012-2013) presents five ideas of what a welcoming environment for Indigenous students can be:

- Curriculum with a focus on culture and language with professional development for all school staff.
- Cross-curricular opportunities where all students learn integrated Indigenous content as core knowledge.
- Creating open extra-curricular events for students and with the local Indigenous community.
- Provide a diverse collection of Indigenous resources in the library and practice cultural experiential learning applications.
- Teachers creating authentic and meaningful relationships with Indigenous students through real-life conversations.

To which Battiste (2013) adds that blending the current K-12 curricula with Indigenous knowledge requires these three things:

- The diversity of Indigenous knowledge protocols, preparations, and purposes be respected

- Creating ethical and constitutional responsibilities and guidelines for educators researching Indigenous knowledge
- An understanding of the preparation and purpose in sharing Indigenous knowledge

Indigenous education, for many raised in the colonial (Western) school system, can be difficult to navigate and implement. It is necessary for any educator taking Indigenous education seriously to do their research and understand the histories and current state of the education system and its relationship to Indigenous people in Canada. It is not a happy past, and there is a chance that there will be missteps and mistakes made along the way in the journey of reconciliation, but if we work together with the right motivations and intent there is reason to believe that we can overcome the crimes and misdeeds of the past. We can create a brighter future for everyone on this shared land, the land from which we learn.

Technology Education

Introduction to Technology Education

Technology education is a broad umbrella term that covers multiple hands-on-learning courses within the BC education system, commonly known as "shop classes." The BC curriculum focuses on Woodwork, Metalwork, Automotive/Power Technology, Drafting, and Electronics / Robotics. At higher grade levels, some of these courses begin to specialize into subjects such as Art Metal and Jewelry, Engineering, Industrial Coding and Design, Machining and Welding, etc. (BC Ministry of Education, 2016). The core focus of technology education courses, known as the "Big Ideas" within the curriculum, focus on the design process, learning about tools and how and when to use them, and exploring the social, ethical and sustainability considerations of technology (BC Ministry of Education, 2016).

Contemporary Technology Education.

Technology education has evolved very slowly since its inclusion in the modern education system. It began as Industrial Arts (later Industrial Education) which mainly focused on vocational and manual training and generally ignored exploring sociological, psychological, or philosophical concepts, while partnering with industry wants and needs (Petrina & Volk, 1995). In the early 1990's, after a decades-long discussion addressing the shortfalls of industrial arts, a change from industrial arts to technology education took place (Petrina & Volk, 1995). Technology education would be changed to now include focus on subjects like self, society, communication, production, control, energy, and power while still maintaining much of its original focus of hands-on learning and skill building (BC Ministry of Education, 1995).

In 2004, a supplement was released as an addendum to address what were perceived as holes in the technology education curriculum. This supplement would lessen the effectiveness of the new focus of the 1995 technology education curriculum on aspects outside manual technique and the information pertinent to performing those manual techniques (BC Ministry of Education, 2004). Seemann (2009) notes that technology education curriculum in many nations is focused on the process rather than on theory and content. It is, at best, a way of building a future work force and, at worst, it is a school subject that offers a mental break from the academic courses associated with literacy and numeracy.

The new BC technology education curricula appear to set out to address the shortcomings of past curricula and the mainly hands-on focus of technology education. The new curriculum has placed a new emphasis on the social, community, and sustainability aspects of technology education. Technology education, as Seemann (2009) notes, is a "know-why" experience, not just a "how-to." This is critical in the act of creating new knowledge as opposed to just using

knowledge. By emphasizing the "know-why," students will be better equipped to learning and developing principles, which in turn opens greater opportunities for holistic education in technology education. With outcomes such as understanding the ethics behind cultural appropriation or exploring the impact of technologies on land, resources, and culture, there appears to be a new shift towards exploring technology beyond processes and finished projects (BC Ministry of Education, 2016). Still, the new curriculum will take some time to be adopted by technology educators and it is very possible that some may not take it on at all.

Defining technology. Technology can be difficult to define and, as Adiels (2011) asserts, is extremely context dependant, as the when, where, and how must be considered. Adiels (2011) defines technology as "What [hu]man(kind) does in order to extend their physical or mental reach" (p.54). This definition does well to cover the term in a broad sense, but fails to consider cultural, community, and sustainability issues related to technology, especially in an educational context. Technology is always viewed through one's values and morals. One person may see a technology and think it is good and right where another person may see it as threatening or counter to their way of life and being (Parikka et al., 2011). These differing points of view of technology by individuals and communities must be recognized to fully understand the impact a technology will have. Parikka et al. (2011) asserts that when defining technology in the lens of technology education, emphasis should be placed on the educational aspects, such as technology users and the designer/developer's interests and understanding. This makes room for Indigenous ways of knowing to be considered and to be inclusive of every other student and their thoughts, feelings, and beliefs.

To begin the process of change in technology education we must redefine what we see technology as to include Indigenous perspectives. To do otherwise is to maintain the dominance

of Western perspectives of what technology is (Gumbo, 2017). This in turn narrows the concept of what technology is, denies Indigenous context and space, and shuts down opportunities of exploring the subject matter outside a Western perspective. To this idea, Gumbo (2017) proposed that a new definition for technology education be implemented as "…the technical application of tangible and intangible aspects of human cultural products to create favourable life conditions in the natural and unnatural (human) world while ensuring sustainable development in particular contexts" (p. 147). Gumbo (2017) defends his definition noting that the terms development and sustainable make space for Indigenous cultures and perspectives. Sustainability includes nature, life support, and community, as development is about developing people, economy, and society. This definition creates room for multiple points of view and offers opportunity for classroom conversation and sharing of points of view.

Technological interaction. When using technology, the average person does not think about the thought process that went into its creation or the ideals that the technology may be representing. Parikka et al. (2011) notes that, until recently, most technology interaction has been reactive or adaptive, meaning users were forced to adapt to the new changes of evolving technologies. More recently, there has been a change in approaching technology, making it more human focused, intuitive, and less destructive to societies, cultures, and the environment. Dakers (2011) asserts that current technology innovation is based on essentialist ideals, creating boundaries between humans and technology, humans and nature, and nature and technology. This ideal has been challenged in the last 100 years, yet the divisions persist despite not recognizing where they came from in the first place. By not critically addressing this, we continue to separate humanity, nature, and technology and evolve them on their own without examining their interconnectedness (Dakers, 2011). Dakers emphasises that the technology

education classroom and humanity itself will be better equipped by finding meaning in technological interaction. We must begin to understand technology and not just accept and use it.

All technologies have positive and negative aspects which should be analyzed and studied as part of the learning process and for future design iterations. This deeper analysis of technologies advantages and disadvantages would greatly aid in ushering in a future where designers and developers will approach their work through a lens of responsibility regarding sustainability and environmental/ecological awareness (Parikka et al. 2011). Fleer (2015) adds their assertion that the interactions between humans and technology are a cultural and historical practice where tools and the gained knowledge work together, affecting technological interaction. This technological interaction is affected by the user, their community's values, and historical contexts, which are all dynamic and ever evolving (Fleer, 2015). These values, in turn, are always forward thinking in transforming human culture based on the collective community's social purpose (Fleer, 2015). These approaches to technological interaction fall directly in line with many of the FPPL (FNESC, 2011). A holistic, community, and environmentally focused approach to technological interaction within technology education could aid greatly in opening a different future for both Indigenous and non-Indigenous students, allowing for all peoples to share their culture and work towards a mutually beneficial future.

Intersecting Indigenous Education with Technology Education

Intersections

Before delving too deep into the application of Indigenous education in technology education, it is important to note that this subject focus is generally under researched. Western science has traditionally hidden or ignored Indigenous knowledge and, as science and technology

are closely connected, this mentality has also been adopted in the technology realms, limiting Indigenous perspectives, curriculum, and ways of knowing, doing, and teaching (Gumbo, 2017; Aikenhead, 2001). Because of this shortfall in Indigenous focused research and the lack of research integrating Indigenous education with technology education, this literature review has made thematic connections from research focused on either Indigenous education, technology education, sustainability, or decolonizing education. With proper skill, preparation, and mindset, these topics of research can be woven together harmoniously, but that change will only come about after we challenge current educational norms and mindsets regarding Indigenous education.

Before technology educators will be ready to enact Indigenous education in their classrooms and shops, it is important that they recognize the need for reconciliation. Battiste (2013) and Child (2015) believe reconciliation is required in Canada if we are to strengthen mutual respect, recognition, benefit, and responsibility to renew relations with Indigenous peoples. As the needs and circumstances of the various Indigenous peoples across Canada vary, a single approach will not be acceptable in addressing unique and varied treaty rights. As technology educators begin to work within the reconciliation framework and spirit, they will need to discover new approaches and processes to the work they do. This work should include exposing colonial injustices (both historical and current), deconstructing past injustices committed to Indigenous peoples, legitimizing and raising collective Indigenous voices within the curriculum, and understanding the dynamic context of Indigenous knowledge and knowing (Battiste, 2013). By confronting current and historical inequalities and injustices, technology educators begin the process of effectively introducing Indigenous education into their classrooms and shops.

The process of adopting Indigenous education up to now has not been quick as Western education systems have been slow to adopt and incorporate Indigenous ways of knowing. Wemigwans (2018) asserts that government heel dragging and lack of will has prevented a reasonable time frame to the needed curricular overhaul. This could be because Indigenous knowledge is often at odds with Eurocentric scientific methods as the two systems stem from differing parent knowledge systems (Battiste, 2013; Snively & Williams, 2016). This creates contention when finding the intersections of these two systems. Andreotti et al., (2011) note that many working in Indigenous education share the hope that Western and Indigenous knowledges could one day have equal respect in mainstream settler educational institutions, but they are very aware of the contradictions and challenges that this goal poses. These roadblocks can be bypassed though if there is a collective will within the education system to overcome them.

The changing of the educator's colonial mindset is only the beginning before change can truly happen in the technology education classroom or shop. Battiste (2013) has laid out a broad roadmap for educators to follow in their journey of Indigenous inclusion to aid educators in making changes:

> To affect the needed reform, educators need to make a conscious decision to nurture Indigenous knowledge, its dignity, identity, and integrity by making a direct change in school philosophy, policy, pedagogy, and practice. They need to develop missions and purposes that carve out time and space, that affirm and connect with the wisdom and traditions of Indigenous knowledge, that are with the people themselves, their Elders, and communities. They need to define what it means to teach in holistic ways and develop humanistic connections to local and collective relationships. They need to make educational opportunities for students that nourish their learning spirits and build strong

> minds, bodies, and spirits. One Cree student shares this analogy: if you have one arrow, it can easily be broken. But put six arrows together and it is difficult for any of them to break. Aboriginal students need a critical mass of peers, allies, and supporters who will help them reach their own potential and create their own successes. (p. 99)

Battiste's pronouncement for educational change echoes in many ways the nine First Peoples Principles of Learning (FNESC, 2011). These principles will be used as a rough guide to better understanding not only Indigenous education, but why and how it can be implemented into the technology education curricula and classroom/shop. The goal is to encourage Indigenous knowledge, experience, and ways of knowing while still respecting mainstream knowledge and experience and to address the knowledge divide that both Indigenous and non-Indigenous need to negotiate with respect, open dialogue, and collaboration (Battiste, 2013; Snively, & Williams, 2016). These nine principles act as a starting place for educators and can be expanded based on local student, community, and Elder needs.

The self, family, community, land, spirits, and ancestors. Technology education should focus on locally used technology to inform its practice in the classroom or shop. By taking a community-based approach, students are afforded an authentic problem with real connection to their community, parents, and Elders (Gumbo, 2015). Gumbo (2015) believes that an Indigenous Technology Education classroom should have teachers who build relationships both within and beyond the school with the greater community and Elders to share knowledge and wisdom. The connections formed through this learning may personalize the experience for the student and give it real world outcomes and consequences. Adding to this, Battiste (2013) and Child (2015) suggest that community-based learning projects can also encourage a healthy community by focusing on connecting and encouraging parent, elder, and broader community's

involvement. By connecting the project to the community and the community to the project, the potential for learning, growth, and community connection all add to the betterment of student learning and the community at large.

To continue building on community focus, there should also be room made for students to explore Indigenous technologies. Gumbo (2015) believes that Indigenous technology has many roles in technology education curriculum, such as addressing misconceptions and misunderstandings about Indigenous people, connecting teaching and learning to home and community, restoring and affirming Indigenous identity and culture, creating collaboration between Indigenous and non-Indigenous learners, and recognizing Indigenous technologies contribution to the economy and society. Seemann (2009) adds that when technologies, processes, or technology education curriculum are explored in differing contexts and cultural views there exists a high potential to discover the values hidden in their design. These insights of a technologies maker and user lead to explain why some technologies ultimately fail and others have a great impact. By opening projects up for learners with a community-based focus, educators offer students a unique opportunity to better connect with themselves, local technologies, businesses, parents, Elders, and the community at large to discover their needs and the social expectations expected of them.

When in the classroom setting, allowing students to share experiences and listen to one another's stories creates opportunity for the building of new meaning into students' own experiences. As students share their stories and are honoured by others they may come to understand and appreciate the storytelling processes within Indigenous and Metis peoples' storytelling traditions. This pedagogical approach works to build respectful relationships between teachers and students and between students themselves making a safe, caring space of

trust, kindness, and empathy (Battiste, 2013). By creating trust within the classroom, students may be more willing to take chances and make mistakes leading to potentially greater learning opportunities for the classroom and school community.

Learning is holistic. Technology education is often considered an experiential exercise, focusing on hands-on project-based learning. Depending on the approach of the instructor, much of the technology education curriculum can meet the goals of being reflexive, reflective, and holistic. Still, there appears to be some shortcomings that can be addressed for the betterment of both Indigenous and non-Indigenous students. A lot of technical education imposed on learners focuses on a Western industrial worldview which compartmentalizes knowledge through module-based learning (Seemann, 2009). Dewey (1966) believes that by separating the mind from the hands-on skills, we put emphasis on skills at the expense of relationships and connections. Education must have universal application and not be specialized. This segregation of subjects, concepts, and community connection caused by Western educational practices does not encourage a holistic approach and may suggest to students that these things are not connected, limiting learning potential. A holistic technology education is a needed outcome of education, especially in cross-cultural technology schooling (Seemann, 2009; Gumbo, 2015; Dewey, 1963). A holistic approach demonstrates to students that skills and knowledge from one discipline can be used in all aspects of life and that all things, whether family, community, or environment, can be teachers in their own way (Simpson, 2014).

Technology is not subservient to science or design. They work together, taking an active role in learners forming new knowledge. Experiencing technology holistically is necessary for learners to attain new knowledge (Seemann, 2009). To this Seeman (2009) presents the concept of technacy education as a holistic and universal approach to understanding technology.

Technacy is proposed as a third partner to literacy and numeracy, to help address its own ideas and to create a sustainable future for humanity. Seemann (2009) defines technacy as:

> …the ability to understand, communicate and exploit the characteristics of technology to discern how human technological practice is necessarily a holistic engagement with the world that involves people, tools and the consumed environment, driven by purpose and contextual considerations. (p. 117)

The technacy concept offers technology educators, as well as educators outside the technology education realm, an approach to the curricula which embraces holistic learning that can also be utilized to meet Indigenous educational goals, outcomes, and principles and integrating them with the Western knowledge system (Archibald, 2008; Battiste, 2013). By practicing Technacy in the classroom/shop, educators offer students of all backgrounds a chance to explore the subject matter at its fullest, making connections that a segregated system would otherwise limit.

By recognizing that Western educational approaches are not the only approach and offering Indigenous student's better opportunities to express themselves in the classroom/shop, students will find greater engagement and success (Snively & Williams, 2016). Educators need to see Indigenous students as diverse, requiring varied approaches to their learning, addressing student needs in a holistic manner based on their intellectual, emotional, spiritual, and physical being (Battiste, 2013; Snively & Williams, 2016). Battiste (2013) asserts that holistic learning is a lifelong process which is experiential and spiritually oriented, being rooted in Indigenous languages, cultures, and communal activity, involving family, community, and Elders. Teachers can claim they are headed towards a holistic classroom when they include social, technical, and environmental factors in their lessons and stress the interconnection between them. This can be

achieved, if in part, by creating learning assessments which clearly addresses the links between the social, technical, and environmental factors and directly relates them to the applied technological solution (i.e., projects) (Seemann, 2009). By breaking down the barriers between students, their communities, and other knowledge systems, they gain greater opportunity to learn and feel true connection with their learning, with others, and with themselves (Snively & Williams, 2016).

The consequences of one's actions. Technology education offers many opportunities for students to recognize the consequences of their actions. When in a shop with many extremely dangerous machines, students need to not only be aware of the danger they could potentially put themselves in, but they also need to be aware of the danger they could put others in. The British Columbia Technology Education Association (BCTEA) offers a guiding document for covering safety in the technology education classroom, *Heads Up! For Safety* (2019). This guide demonstrates the minimum standards to keeping technology education classrooms safe for students and teachers. It is critical that students understand machine use and safety before ever operating said machine for the safety of themselves and others (BCTEA, 2019). The shop class can be an extremely dangerous place, especially for the unprepared or uninformed. By learning and vigilantly demonstrating the safety standards of the technology education classroom, students recognize the potential consequences of their actions and protect themselves and others.

There are also consequences beyond immediate safety concerns, such as those of concern for our environment and sustainability. Oddly, technology is often seen as the root to some of humanity's problems, including climate change, while also being trusted to save the planet, our health, and increase economic productivity (Seemann, 2009). Integrating Indigenous views and ways of knowing will aid in inspiring Indigenous learners and open the minds of non-Indigenous

learners to different ways of approaching sustainability-focused design (Gumbo, 2017). This is supported by Battiste's position that Indigenous knowledge can be used to solve contemporary problems via its dynamic world view and normalize ways of knowing in the classroom (2013). By creating an environmentally conscious classroom, educators prepare students to think critically about what they are designing and making, how they relate to themselves and their community, and the potential environmental ramifications they or others could create.

There are certainly many opportunities beyond the previously mentioned topics to address learners recognizing the consequences of their actions. Those opportunities are perhaps more generic to the education system than being technology education focused. They have not been included here for that reason.

Generational roles and responsibilities. There is already an inherent generational relationship that takes place in the current Canadian education system between teachers and students. To better meet Indigenous student needs and share Indigenous knowledge, inviting Elders and Knowledge Keepers into the classroom creates new opportunities that would otherwise not exist in sharing generational knowledge and culture (Battiste, 2013; Gumbo, 2015). Elders, Knowledge Keepers, and workers competent in Indigenous language and knowledge should be treated with great respect as the knowledge they (sometimes conditionally) share help to improve and develop curricula and other educational media forms, strengthening the implementation of Indigenous knowledge and improving the success of Indigenous students (Battiste, 2013). Gumbo asserts that enacting intergenerational learning within the technology education classroom/shop could result in empowered students, who are open to others' knowledge, and who are able to work collaboratively exploring multiple perspectives, through varied design projects and contexts (2015). Elders and Knowledge Keepers offer students a

unique perspective exploring cultural ideas and traditions while learning from the wisdom of older generations while encouraging community and connection.

Indigenous Knowledge Keepers and Elders can become extremely busy from the responsibilities and demands of their community and school system relying on them for information. Because of this, Wemigwans (2018) suggests allowing those entities to post their knowledge to Indigenous knowledge websites to ease their load and share their knowledge using an alternative cultural resource. This is presented with the caveat that not all Indigenous knowledge should be posted online as it may not be appropriate to share broadly based on cultural protocols (Wemigwans, 2018). By sharing knowledge online, Elders and Knowledge Keepers can share information in times they are not available or have it posted to websites for users to find and learn from them outside the education system. It should be noted that this approach is not a replacement for real-life interaction with Elders and should be used only when required and when appropriate (Wemigwans, 2018). By respecting Elders and Knowledge Keepers time and wisdom being shared in the classroom, educators create room for Indigenous wisdom to be shared in an intergenerational way which encourages community, sharing of ideas/perspectives, and sharing culture with Indigenous and non-Indigenous students.

Sacred knowledge. For some non-Indigenous educators, the idea of sharing Indigenous knowledge and implementing it in the classroom can be scary to the point of preventing them from moving towards an Indigenous education model. The thought of sharing the wrong information or not knowing the correct protocols can lead to educators stopping before they ever begin. To overcome these fears, educators will need to educate themselves in proper protocols with their local Indigenous community. It is important to be sure that Indigenous knowledge comes from well-respected Elders and Knowledge Keepers that have credibility within their

community (Wemigwans, 2018). These rigors protect the knowledge, aid in maintaining authenticity, and gives true value to the Indigenous knowledge being shared with the community and students (Smith, 1999). By authenticating the sources of information with the local Indigenous community, educators will have a greater peace of mind when working with an Indigenous education perspective.

By bringing in Elders and Knowledge Keepers into the classroom/shop, educators offer a different perspective for many students and an opportunity for intergenerational sharing and interaction. It is possible, when bringing in Elders and Knowledge Keepers, that they may need or wish to share sacred knowledge. Sacred teachings are traditional knowledge that are passed on to others through ceremonial protocols by Elders, traditional teachers, and Knowledge Keepers. The Indigenous knowledge they hold and share is held in trust for the community with the expectation that they abide by their knowledge's cultural protocols (Wemigwans, 2018). Sacred knowledge differs from personal knowledge, which is not bound by community protocols like sacred teachings. It is acquired by the individual through educational pursuits, natural talents, personal experiences, and spiritual knowledge learned through dreams, visions, intuitions, and meditation (Wemigwans, 2018). Some educators may be hesitant to introduce information/knowledge or acts that they deem to be potentially religious in nature into their classroom. The public-school system has made a concerted effort to keep religion/spirituality out of the classroom. The preparations, ceremonies, and rituals required when learning some Indigenous knowledge may create an issue for some educators and administration. Battiste (2013) asserts that this problem may be addressed by approaching Indigenous knowledge as a way of knowing and not as religious content which would likely create barriers to teaching Indigenous knowledge in public schools. This approach was challenged and struck down in the

court case *Servatius v. Alberni School District No. 70* (Thompson, 2020), where it was deemed that a smudging ceremony which took place in a Port Alberni, BC school was not a religious act but a cultural one. This precedent confirms Battiste's assertion and may give some educators peace of mind when exploring these types of learning experiences.

Conclusion

Technology education teachers need to be vigilant when implementing Indigenous knowledge in their classrooms and not fall back on the status quo. They should look to take advantage of points of synergy between Indigenous and Western knowledges and have the two work together in a complementary way (Gumbo, 2017). Educators and school systems are in an important position of power within Canadian society and it is important that is recognized and approached with care. Battiste (2013) asserts that entities who control power over meaning and knowledge diffusion have power and privilege over others. This power has been used within the school system to prioritize some knowledge over others in the form of standards. This is often under the guise of being for the wellbeing of students and can lead to the exclusion of knowledge from the curriculum (Battiste, 2013). It is important that educators take care in their classrooms and the school at large to confront "the standards" and challenge them to see if they are meeting the needs of all students, not just the majority.

So, what does an Indigenous education minded technology education teacher need to do? This is not an outright easy question to answer, as the needs of every classroom and community varies. In general, however, teachers should show interest and respect for forms of knowledge and technology outside traditional Western perspectives and make room for all learners no matter what their background may be (Gumbo, 2015). This will allow greater opportunity for sharing, engagement, and enriched learning for students with experiences outside Western

thinking and approaches. Further, educators can connect their classroom and projects to the greater community, via Elders, Knowledge Keepers, and other members and entities of the local community. This creates opportunity for connection and growth within the community and the sharing of local knowledge, beliefs, and values.

Chapter Three: Indigenizing Shop

The main body of work for this project is in the form of a website made to aid technology education teachers in BC to begin intersecting Indigenous education in their shops. Further, the website acts as a hub where technology teachers can share resources with other teachers with the focus on Indigenous education. The website can be found at https://indigenizingshop.opened.ca/.

As the site is designed to be a hub for shareable information for technology education teachers, a Creative Commons licensing was chosen. More specifically, the CC BY-NC-SA 4.0 designation was chosen. The reason for this designation is that it forces others to give proper Attribution (BY) or credit to the original author of the work (Creative Commons, 2020). Further, it allows for the Non-Commercial (NC) sharing of the material, preventing others from profiting off the hard work of others. Lastly, it allows others to Share Alike (SA), opening the material to users to be remixed, altered, and to be added to. This is an important designation as it allows technology education teachers to take the lessons and work from the website and adapt it to their local community needs and learning strategies.

WELCOME

This site has been created for technology education teachers of British Columbia as a resource to aid in the implementation of Indigenous education in the classroom and shop. The resources and educational techniques presented are based on The First Peoples' Principles of Learning (FPPL). This framework was chosen as it is familiar to many educators within the province. More importantly, it was chosen as it is a well accepted and respected guide to introducing/implementing Indigenous education.

References Cited

Attributions

WHY INDIGENIZE SHOP?

I chose to investigate the implementation of Indigenous education with technology education because I, and other technology education teachers I have spoken with, have struggled with adapting, and including Indigenous education in the technology education classroom/shop. To make matters worse, it can be difficult to track down resources as the intersection of Indigenous education and technology education are both generally under researched. This led me to the idea of creating an open online website for technology educators to find and share resources for others to use in their shops, classrooms, and beyond.

The goal of this website is to address the disparity between Indigenous and non-Indigenous learners in BC by creating an online website that will act as a resource for technology educators to guide in implementing and intersecting Indigenous education with technology education classes and shops. The goal is not to present a definitive model of Indigenizing technology education. Taking this approach would not meet the needs of most communities and create resources that would be inadequate and possibly even counterproductive or inaccurate. The resources created and presented should be used as guides for educators to implement in their classrooms/shops to meet their students and community needs. Educators will still be required to do the work of connecting with local Elders, Knowledge Keepers, parents, businesses, and students to create authentic lessons and connections.

Why Indigenous Education?

Current statistics show that there is work that needs to be done so that the BC education system can honour its agreements with Indigenous peoples. In BC, 74 percent of non-Indigenous students receive a Dogwood Diploma certifying their graduation as compared to the 52 percent of Indigenous students who meet the same outcome (BC Ministry of Education, 2018). Furthermore, only 33-35% of both Indigenous and non-Indigenous grade 12 students in BC feel that they are being

Indigenous and non-Indigenous grade 12 students in BC feel that they are being taught about Indigenous peoples in Canada (BC Ministry of Education, 2018). This could be because teachers find including Indigenous views difficult and rely on the more comfortable stories of Canada that they already know (Donald, 2009). Furthermore, it requires teachers to challenge the core of their Western based institutions which provides them with their authority and position of privilege (Ahenakew, 2017). To address this issue, educators have a social responsibility to decolonize themselves and recognize the damages of colonialism (Battiste, 2013). This website is my way of attempting to do that very thing to better myself, my classroom, my community, and hopefully inspire others to do likewise.

Historical Context

Many educators in BC will likely already be familiar with the history of residential schools and the continuing process of reconciliation in BC and Canada at large. In many schools across the province it has become a lesson that is retold annually (if not more often) to recognize the harms perpetrated on Indigenous communities and peoples. It is important to understand and act on rectifying this tragic attempt at assimilation because it has been the cause of many harmful and lasting traumas to Indigenous communities, peoples, and their ways of knowing and being. Below you will find a brief outline of residential schools and reconciliation, but for a more thorough understanding please visit the Canadian Encyclopedia and the National Centre for Truth and Reconciliation websites for a more detailed accounts.

Residential Schools

When settlers began to colonize what would become Canada, there were numerous attempts to separate Indigenous peoples from the land and stifle their ways of living and knowing. Perhaps one of the most infamous of these attempts was residential and boarding schools for Indigenous children (Truth and Reconciliation Commission of Canada, 2015). These schools took Indigenous, Inuit, and Metis children from their homes and attempted to erase their culture and replace it with a Eurocentric one (Smith, 2017).

Although residential schools have been abolished, there have been many lasting negative effects, including a disruption of ancestral traditions, of intergenerational socialization, and of land awareness which is compounded further by the current education systems which commodify the land. This means that modern education and society are affording less and less Indigenous people the chance to engage with the land, plants, and animals in similar ways that their ancestors would have. Furthermore, the publication of Honouring the Truth, Reconciling for the Future: Summary of the Final Report of the Truth and Reconciliation Commission (TRC) of Canada (2015) has shown the cost that the residential school's assimilation policies have had on the individuals who were required to attend the institutions. It has damaged communities, weakened language and cultures, and caused a distrust of formal education systems by many Indigenous people. To further compound this, mainstream education has caused negative stereotypes to go unchecked among non-Indigenous Canadians (Truth and Reconciliation Commission of Canada, 2015). All

these events and realities have coalesced to create a system and population that are hostile to Indigenous Peoples.

Reconciliation

The Truth and Reconciliation Commission was created as per the Indian Residential Schools Settlement Agreement and released its final report in 2015 featuring 94 Calls to Action of which three were specific to education in Canada. These include outcomes such as (TRC, 2015):

63.1 Creating curriculum and providing funding for important Indigenous issues to be implemented in K-12 classrooms.

63.2 Creating an environment for students promoting intercultural understanding, empathy, and respect.

63.4 Identifying teacher training regarding Indigenous education.

The TRC (2015) final report also stresses the importance of relationships, truth, healing, and justice with each other and the environment, all important themes within Indigenous education. This call to action has now become the responsibility of all Canadians to better the future for both Indigenous and non-Indigenous peoples living on the lands of Canada. It is our duty as educators to work to rectify the mistakes of the past and create an education system that serves all its population and not just the larger body.

Decolonization and Racism

The Canadian education system, both past and present, has attempted a forced assimilation of colonialist thinking and principles on Indigenous peoples, causing trauma on multiple generations. This violence has in turn led partly to high levels of suicide, substance abuse, incarcerations, children in foster care, and family violence in Indigenous homes and communities (Battiste, 2013). Other symptoms of racial oppression experienced by Indigenous Peoples are poverty, substandard housing, poor water access, lack of sanitation, health concerns, high-risk maternal care, birth defects, youth disabilities, children in care, unemployment, high stress levels, and low coping skills leading to trauma, violence, incarceration, and suicide (Battiste, 2013). These symptoms of oppression continue due to the indifference of Canadians and the governments that represent them.

Race is a social construct. Race is a belief and social attitude and not based on the make-up of genetics or biology, such as eye colour or hair colour (Battiste, 2013). It is important that racism is confronted not only historically but also in the current contemporary contexts (Battiste, 2013). To confront racism, one must confront their potential positions of power and privilege which may not be immediately obvious to individuals benefitting from said racism. It is important to address issues of racism both within and outside the classroom. This will create a space for racialized students to feel safe, welcome, and better prepare them for learning by

creating a positive community within the classroom.

To reach decolonization of education, curricular outcomes must address the indignities and tragedies imposed on Indigenous people through the past and current colonial education system. The decolonized education system must dismantle curricular knowledge choices, transforming education to focus on the contexts of people's lives, and on individualized learning (Battiste, 2013). These approaches will be instrumental in aiding the coming generations to rethink the colonialist mindset and confront the racism that has been integrated into Canadian society.

References Cited

Attributions

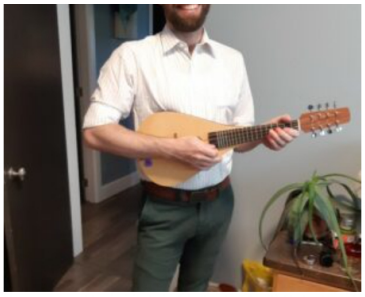
ABOUT AUTHOR

I would like to start by thanking the Coast Salish Peoples who's land I have lived on my entire life. I would specifically like to thank the Lekwungen/Songhees People whose land I currently live on, the T'Souke Nation who I work with and whose land I work on, and the Sc'ianew Beecher Bay and Pacheedhat Nuu-chah-nulth Peoples who I also work with. I intend to honor the sharing of land and resources by using my position as an educator to protect and share Indigenous knowledge and ways of knowing to the best of my abilities. As an Indigenous ally, I wish to create a safe classroom/shop for all students to learn to their greatest potential and guide them to their futures while connecting them with each other and the community, be that Elders, Knowledge Keepers, parents, businesses, or other community entities for the betterment of all.

Hych'ka Kleco Kleco Gilakas'la Marsee Thank you

As a non-Indigenous cis male of mainly Irish and English descent, the thought of working on a project focused on Indigenous education can feel a little daunting at times. There is a fear that I believe many non-Indigenous teachers initially have when addressing Indigenous education that you may unintentionally cause disrespect or share knowledge incorrectly. That fear is likely a correct one, but I believe it is my duty as an educator, an Indigenous ally, and a Canadian to address historical wrongs that have taken place and use my position, as best I can, to create a better future for my entire community. I may make mistakes, but I intend to learn from them and always strive to move towards a more empathetic and understanding future. I hope this project can be viewed as a piece of my commitment to ongoing growth as an ally and to building lasting relations with the Indigenous Peoples of the land where I live and work.

I currently teach woodwork and drafting which is why many examples provided on this site will reflect that



focus. I created this site with the hope that it can stand as a living document that other technology education teachers can add their own examples and experiences to in time.

Jeremy O'Shea

References Cited

Attributions

CONTACT

The goal of this website is to present accurate and helpful information for technology education teachers to best integrate Indigenous education. Please feel free to contact me if you have any comments or concerns about the website or any of the information presented. If you feel anything is incorrect, I would love to hear from you to better present the information more accurately. This is a continued learning process for me and I recognize I am capable of making mistakes.

Contact

Name

First Last

Email

Comment

Submit

PRINCIPLES OF LEARNING

The First Peoples' Principles of Learning

Here we explore the First Peoples' Principles of Learning (FPPL) and present some ways to implement them within the technology education curriculum. Some educators may find that the principles and approaches presented may fit easily within their classroom culture and approach to teaching. Others may find themselves challenged by a different way of teaching and learning outside the more traditional Canadian (Euro-centric) scope. Either way, the goal of this site is to challenge educators to grow and begin/continue the conversation for greater Indigenous focused education within British Columbian schools.

It should be noted that the principles listed, although separated for clarity, work best together as a whole. This, in fact, falls in line with one of the FPPL tenets, encouraging a holistic approach to education. Further, it should be noted that the FPPL is a generalized approach to Indigenous education that works to meet the common values of the numerous Indigenous societies within British Columbia (BC). It is important to understand that the different Indigenous societies and nations within BC have some commonalities but ultimately need to be treated as unique and independent nations.

Taking on an Indigenous approach to one's classroom/shop requires connections to be made between educators and the local Indigenous groups to be effective and authentic. With this is mind, it should be noted that the approaches listed on this site may be context dependent. This means, for example, that a lesson on Coast Salish design principles may not be appropriate, authentic, and/or accurate outside the Coast Salish territories. In fact, even within said territories it should be

confirmed that the lesson is accurate to the local Indigenous nations' and groups' beliefs and practices.

It should also be noted that educators should get the permission of local Indigenous nations and Elders if using certain Indigenous knowledge. Many Indigenous nations and peoples hold some stories, songs, and knowledge as sacred and not to be shared unless express permission is given. This can be a difficult practice to address for many educators coming from a more Euro-centric approach to education where knowledge is readily shared and commodified.

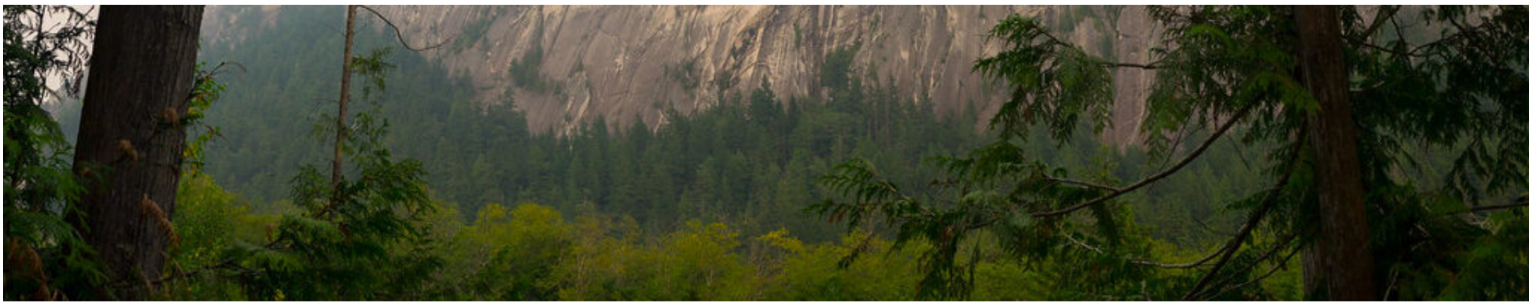
The First Peoples' Principles of Learning are as follows:

The First Peoples Principles of Learning has been used by this website as a framework for intersecting Indigenous education with technology education. The nine principles are as follows (FNESC, 2011):

- Learning ultimately supports the well-being of the self, the family, the community, the land, the spirits, and the ancestors
- Learning is holistic, reflexive, reflective, experiential, and relational (focused on connectedness, on reciprocal relationships, and a sense of place)
- Learning involves recognizing the consequences of one's actions
- Learning involves generational roles and responsibilities
- Learning involves patience and time
- Learning recognizes the role of Indigenous knowledge
- Learning is embedded in memory, history, and story
- Learning requires exploration of one's identity
- Learning involves recognizing that some knowledge is sacred and only shared with permission and/or in certain situations

Applying the First Peoples Principles of Learning to technology education

This section explores various approaches technology educators can take to implement Indigenous Education in their shop or classroom. Please click on the drop-down menu or on the links above to explore the different principles in greater detail.



THE SELF, FAMILY, COMMUNITY, LAND, SPIRITS, AND ANCESTORS

First peoples Learning ultimately supports the well-being of the self, the family, the community, the land, the spirits, and the ancestors

For many technology education teachers, the goal of their field is to direct students to potential careers in the trades and introduce them to hands-on design-focused project-based learning. While this goal is important it is not necessarily a focus of the First Peoples' Principles of Learning (FPPL). What the first principle of the FPPL does explore is the relationships between students and the people they interact with and land they live on. It encourages educators to support student's well-being and relationships with family, community, the land, spirits, and ancestors. The connections formed through this type of learning may personalize the experience for the student and give their learning real world outcomes and consequences. Further, it encourages the growth of students in their relationship with the land they live on, the people they live and interact with, and the history they come from.

The following are some possible approaches and ideas that can be adapted to any technology education shop or classroom.

Connect projects and lessons to self, family, and community

Community-based learning projects can strengthen a community by focusing on connections and encouraging parent, Elder, and community member involvement (Battiste, 2013; Child, 2015). By connecting the project to the community and the community to the project, the potential for learning, growth, and connection all add to the betterment of student learning and the community at large.

Technology education's curriculum focus' heavily on the design process. By including peers, family, Elders, and the broader community in the design process, students may discover many ideas they had not considered while strengthening connections between students and others both inside and outside the classroom.

Use storytelling as a tool for learning and making connections

Allowing students to share experiences and listen to one another's stories creates opportunity for the building of new meaning into students' own experiences. As students share their stories and are honoured by others they may come to understand and appreciate the storytelling processes within Indigenous and Metis peoples' storytelling traditions. This pedagogical approach works to build respectful relationships between teachers, students, and possibly even entities outside the classroom. This in turn creates a safe, caring space of trust, kindness, and empathy (Battiste, 2013). By creating trust within the classroom, students may be more willing to take chances and make mistakes leading to potentially greater learning opportunities for the classroom and school community.

Creating space for story telling in the classroom can take many forms. This could take the form of a learning/talking circle and discussing a subject or problem and opening the floor to students' points of view and experiences. It could also be inviting an Elder to participate in the classroom and share their knowledge and stories with students (If they wish to). To gain family involvement, you could ask students to pose a question or ask for stories from their parents, guardians, or other family members about a subject and record their answer via video/audio/written format to be shared with the class.

Encourage self, peer, family, and community reflection/assessment of student learning

Self assessment offers students the opportunity to reflect on their learning, failures, and triumphs. By being honest and mindful of their learning, students may take more from the lesson/project then they may have otherwise had they not taken the time to reflect on their work. This process can be done relatively simply by having a student mark themselves using the same marking criteria the teacher is using for assessment. Students should state where they succeeded and where they need more work developing their skills and knowledge.

By having peers, family, and trusted community members also involved in the assessment process, students can get a perspective outside the students own and the teachers. This can open the lesson/project to ideas and points of view beyond the initial scope. It allows for the project to potentially take on a whole new focus with a greater connection to people outside the classroom and to concepts beyond the discipline being studied. The teacher's assessment can also be used for this process or other less formal methods of assessment can be utilized. For example, a showcasing of the completed project to the entire class or even the greater community offers the opportunity for peers, family, and community members to see the completed project and discuss it with the student. Students could then interact

with others, learning differing points of view and explaining/discussing the knowledge/skills gained from the project.

Explore the materials and resources used for the project/lesson and their connection to the land and environment

As most land-based resources are finite, it is important for technology educators to discuss the relationship between humankind and the land we use and live on with their students. Many technology education curricula already focus on the environment, the use of resources taken from the land, and exploring how they can be used sustainably. Because of this, discussion of resources and sustainability is often already covered by many technology educators in some manner.

It is important in many Indigenous cultures to respect the land and use its resources wisely. This occasionally, puts some Indigenous nations at odds with governments and corporations who have a more euro-centric/capitalist mindset. These differing approaches should be discussed and explored in the classroom. This point may be connected in a local context depending on the local nations. For example, in Sooke, BC, the T'Souke First Nation has built greenhouses and installed solar panels to create a more sustainable future for the people of the nation. They did this using the Seventh-Generation principle as a guide; to work towards a sustainable future for the coming seven generations. They now grow their own food and can power multiple buildings with solar energy. This concept opens many opportunities to discuss sustainability, local food production, and solar energy concepts.

Understand the connection between the land with self, family, community, spirit, and ancestors

This concept builds upon the last one but lends more focus to the social and political aspects of sustainability both historically and in a modern context. By connecting lessons on sustainability, resource management, and environmental concerns with local Indigenous and Non-Indigenous points of view (both historically, in the present, and in a future context), students will be afforded the opportunity to build a sense of greater empathy and understanding between themselves and the other entities. This discussion could be kept within the classroom but could also include local Elders and other appropriate members of the community to present a broader variety of points of view, further enriching the discussion. The addition of an Elder, in this scenario, could alleviate the teacher of personally taking on the discussion of connections of students to the spirits and ancestors, a subject they may have no authority discussing in depth.

The connection of the self to the land also takes on another form as the relationship to the land is at the heart of Indigenous education. The role of the teacher is taken on by the animals, plants, and landscapes (Marker, 2004). Everyday interactions with family, community, and environment are all teachers in the broad understanding of what Indigenous education is (Simpson, 2014). This can be difficult to address in the current education system, especially at the high school

level where classes are short, field trips can be costly, and journeys into nature can be difficult or restricted due to location. Despite these hurdles, it is important to try and get outside the classroom sometimes to get the lived experience.

Why would a woodwork class want to learn about trees and wood as a concept when you can go outside and interact with the local living trees and plants? This could lead to greater discoveries of the importance of trees, not only to humans, but to the ecosystem (plants, bugs, animals, etc.). Further, it could lead to discussions of the various uses of different types of trees historically, in a current context, and Indigenous uses, such as for canoes, shelter, bark weaving, etc.

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HOLISTIC, REFLEXIVE, REFLECTIVE, EXPERIENTIAL, AND RELATIONAL

Learning is holistic, reflexive, reflective, experiential, and relational (focused on connectedness, on reciprocal relationships, and a sense of place)

At the high school level, the current education system generally relies on learning specific subject matter in a singular space (i.e., classroom, shop, gymnasium, etc.) and often out of context to the subject. One advantage most technology education classes have is that they are all experiential in nature. Still, many shop focused classes don't tend to go outside the classroom/shop. The rooms themselves become insular, cut off from the world and from other classrooms in the building. This principle looks to have the figurative walls of the classroom/shop knocked down to allow students to see the connections between what they are learning in the shop with other classrooms/subjects within the school and the greater community. This opens opportunities for students to explore themselves as a whole person and in turn the learning and lessons can be better personalized to the students needs, interests, and strengths.

Learning goes beyond the curriculum. It should not be siloed into narrow subject matter devoid of connection outside the discipline

A lot of technology education focuses on a Western industrial worldview which often compartmentalizes knowledge through module-based learning (Seemann, 2009). By separating the mind from the hands-on skills, we put emphasis on skills at the expense of relationships, connections, and theory (Dewey, 1966). This segregation of subjects, concepts, and community connection caused by Western educational practices does not encourage a holistic approach and may suggest to students that these things are not connected, limiting learning potential. A holistic technology education is needed, especially in cross-cultural technology schooling

(Seemann, 2009; Gumbo, 2015; Dewey, 1963). This demonstrates to students that skills and knowledge from one discipline can be used and applied in all aspects of life and that all things, whether family, community, or environment, can be teachers in their own way (Simpson, 2014).

The technology education curricula, for the most part, focuses heavily on the design process. The design itself offers an opportunity for students to express themselves and explore their interests in a unique way. Design-based projects can encourage a holistic approach by allowing students to express themselves physically, mentally, socially, emotionally, and spiritually. It is important that teachers make room for their students to express themselves in these ways and to make the space safe for students to feel comfortable enough to let their guards down.

By recognizing that Western educational approaches are not the only approach and offering Indigenous student's better opportunities to express themselves in the classroom/shop, students will find greater engagement and success (Snively & Williams, 2016). Educators need to see Indigenous students as diverse, requiring varied approaches to their learning, addressing student needs in a holistic manner based on their intellectual, emotional, spiritual, and physical being (Battiste, 2013; Snively & Willaims, 2016).

Teachers can claim they are headed towards a holistic classroom when they include social, technical, and environmental factors in their lessons and stress the interconnection between them. This can be achieved, if in part, by creating learning assessments which clearly address the links between the social, technical, and environmental factors and directly relate them to the project or lesson (Seemann, 2009). By breaking down the barriers between students, their communities, and other knowledge systems, they gain greater opportunity to learn and feel true connection with their learning, with others, and with themselves (Snively & Williams, 2016).

Flexible projects make room for more learning

A challenging aspect of teaching shop classes can be creating projects and lessons that appeal to the greatest number of students while affording them the opportunity to explore new ideas and themselves in new ways. Sometimes it may be in the student's best interest to alter a project or lesson to encourage a new avenue for learning that the teacher may not have considered and/or create greater student engagement. For example, if a student has been given a design challenge to create a mortise and tenon jointed table but wishes to change the project into a stepping stool for their grandparent to use at home, it is in the students best interest to encourage that change. It should be noted that the student may be required to do some extra work and may need to still include mortise and tenon joints in some manner. This real-life desire to help a family member and better the lives of those around them should be encouraged and celebrated.

Reflection as a means of learning

Having students reflect on their work is an important aspect of learning. By including a reflection process in the assessment of a project students will be made to take a more serious look at what they have accomplished and learned. This reflection can take many forms and may need to be based on a student's needs and learning style. It could be as simple as having a student respond to written prompts about their project or as complicated as organizing an open house with the community where students show off their projects and discuss them with family and other community members. Another source of reflection is through peer assessment which offers students a chance to learn through others learning and explore design ideas outside their own project.

Technology education is about experiencing learning

Because of the hands-on nature of technology education courses, experiential learning is a bit of a given. Students are inherently given the opportunity to try different technologies and materials in a manner that is practical and hands-on.

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THE CONSEQUENCES OF ONE'S ACTIONS

Learning involves recognizing the consequences of one's actions

Recognizing the consequences of one's own actions can be a hard lesson to learn. The shop class setting is a natural place to practice reflecting on one's actions and how they affected their work, their relationships, and interactions with the land. This principle is not always intrinsic to students, or even many adults, and may require teachers to step in and aid students in reflecting on their actions and what the consequences may have been.

Individual responsibility, social responsibility, and safety

Technology education intuitively offers many opportunities for students to recognize the consequences of their actions. When in a shop with many extremely dangerous tools and machines, students need to be aware of the dangers to themselves and others. The British Columbia Technology Education Association (BCTEA) offers a guiding document for covering safety in the technology education classroom, *Heads Up! For Safety* (2019). This guide demonstrates the minimum standards to keeping technology education classrooms and shops safe for students and teachers. It is critical that students understand machine use and safety before ever operating said machine for the safety of themselves and others (BCTEA, 2019). Strict protocols need to be put in place to prepare students to uphold safety standards for themselves and to also ensure the safety of others in the room. Creating a classroom culture of mutual safety among students is paramount to reducing physical, mental, and emotional harm.

Precision and mindfulness

Almost every technology teacher can attest that students who are careless or rush their work will create an inferior final product. Educators need to aid students in

learning what patience is and how it often pays off in the long run. It is a hard skill to learn and (perhaps appropriately, if not ironically) takes a long time to learn. Helping students hone their skills of focusing on the task at hand and taking their time will set them up for future success.

Care for the land

Technology is often seen as the root to many of humanity's problems (such as climate change) while also being trusted to save the planet, our health, and increase economic productivity (Seemann, 2009). Integrating Indigenous views and ways of knowing will aid in inspiring Indigenous learners and open the minds of non-Indigenous learners to different ways of approaching sustainability-focused design (Gumbo, 2017). By creating an environmentally conscious course, educators prepare students to think critically about what they are designing and making, how they relate to themselves and their community, and the potential environmental ramifications they or others could create if proper care and research is not taken.

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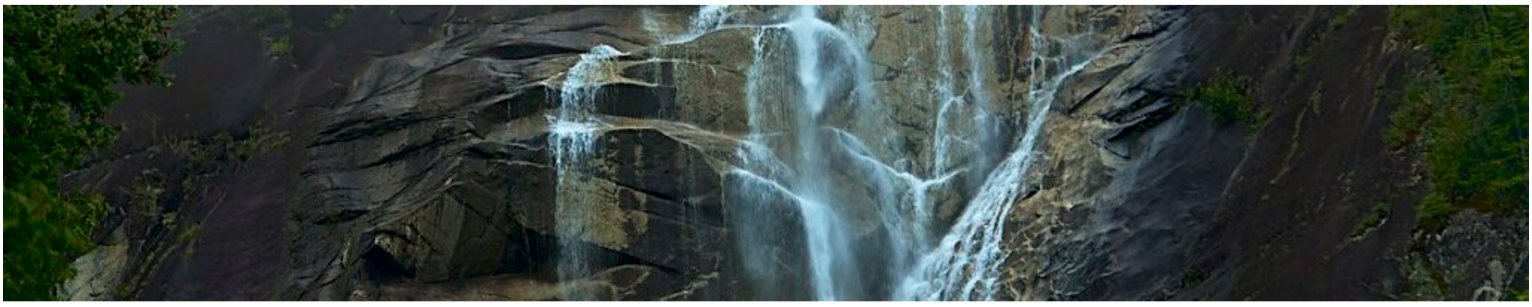

GENERATIONAL ROLES AND RESPONSIBILITIES

Learning involves generational roles and responsibilities

This principle encourages the sharing of knowledge and ways of knowing from one generation to another. This can take many forms from story to demonstrations to just regular interaction with students. Overall, this principle promotes the sharing of wisdom and creating connections between the different generations of a community.

Elders in the classroom/shop

There is already an inherent generational relationship that takes place in the current Canadian education system between teachers and students. To better meet Indigenous student needs and share Indigenous knowledge, inviting Elders and Knowledge Keepers into the classroom or to share their knowledge by other means creates new opportunities that would otherwise not exist in sharing generational knowledge and culture (Battiste, 2013; Wemigwans, 2018; Gumbo, 2015). Elders, Knowledge Keepers, and workers competent in Indigenous language and knowledge should be treated with great respect as the knowledge they (sometimes conditionally) share helps to improve and develop curricula and other educational media forms, strengthening the implementation of Indigenous knowledge and improving the success of Indigenous students (Battiste, 2013). Enacting intergenerational learning within the technology education classroom/shop could result in empowered students, who are open to others' knowledge, and who are able to work collaboratively exploring multiple perspectives, through varied design projects and contexts (Gumbo, 2015). Elders and Knowledge Keepers offer students a unique perspective exploring cultural ideas and traditions while learning from the wisdom of older generations while encouraging community and connection.

Indigenous Knowledge Keepers and Elders can become extremely busy from the responsibilities and demands of their community and school system relying on them for information. By seeking out those entities to post their knowledge to Indigenous knowledge websites Elders can ease their loads and share their knowledge using an alternative cultural resource (Wemigwans, 2018). This is presented with the caveat that not all Indigenous knowledge should be posted online as it may not be appropriate to share broadly based on cultural protocols (Wemigwans, 2018). By sharing knowledge online, Elders and Knowledge Keepers can share information in times they are not available or have it posted to websites for users to find and learn from them outside the education system. It should be noted that this approach is not a replacement for real-life interaction with Elders and should be used only when required and when appropriate (Wemigwans, 2018). By respecting Elders and Knowledge Keepers time and wisdom being shared in the classroom, educators create room for Indigenous wisdom to be shared intergenerationally which encourages community, sharing of ideas/perspectives, and sharing culture with Indigenous and non-Indigenous students.

Other family and community members in the classroom/shop

Inviting student's family or community members into the classroom can also open opportunities to learn different skill sets, points of view, and present opportunities to learn about different occupations and ways of knowing from the people who live them. This does create some extra work for the teacher but can create learning moments that may have never happened otherwise. How the family or community member is utilized may depend on their knowledge base and what they are comfortable/able/willing to offer. This should, of course, be done through proper channels regarding outside visitors in the classroom which are generally different from school to school.

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THE ROLE OF INDIGENOUS KNOWLEDGE

Learning recognizes the role of indigenous knowledge.

Indigenous knowledge is a system of knowing and being that is passed on from one generation to the next. There is no one singular body of Indigenous knowledge, just as there are countless knowledge systems that can be found around the world. Indigenous knowledges are ever changing and adapt to the location and conditions of the land and peoples they are practiced by. It is a blend of both traditional and contemporary knowledge. The First People's Principles of Learning (FPPL) is an example of a broadly framed approach to Indigenous knowledge and ways of learning and teaching. To truly practice and experience Indigenous knowledge in the school system requires the consent and participation of local Indigenous peoples.

Both Indigenous peoples and many mainstream (Western) educational institutions are now recognizing Indigenous knowledge. This has given it a raised legitimacy to its social value and as a system of knowledge. It has also begun exposing Western prejudices that act against Indigenous knowledges (Battiste & Henderson, 2009). There are many different approaches to including Indigenous knowledge in the BC school system. Many school districts encourage that teachers include some form of Indigenous education in their classrooms. This often takes the form of lessons that are made to fit the current system. The goal of this website is to encourage educators to try and go beyond that approach and bring about a more inclusive mindset, combining the current system and an Indigenous system as equals.

Making change

Educators themselves need to become the learners if they wish to truly be Indigenous allies. They must take the time to listen and seek out Indigenous

knowledge to first develop their own understanding. This new understanding will in turn prepare them to explore Indigenous knowledge with their students in a meaningful way. The best place to start learning about Indigenous knowledge is going to be locally. Connecting with local Indigenous communities and organizations will help in providing resources and help break down walls between the school and the local community. Further, some schools and many districts have Aboriginal/Indigenous education departments that can also provide resources and ways of making local connections, such as inviting an Elder into the classroom or having a carving demonstration from a local Indigenous artist. It is highly recommended to connect with these resources, if available.

A system built for some, not all

Educators must recognize the biases and value systems of the school they work in. Many educators who were raised through the Canadian education system may take the system itself for granted and not challenge it. It is important for educators to see who is making the decisions, why they are being made, and who those decisions benefit. Working to disrupt the current systems status-quo is the only way any moderate change will be made toward expanding the inclusion of Indigenous knowledge in school curricula and classrooms.

Connecting to the shop, connecting outside the shop

Indigenous knowledge needs context, history, and connection. Shop can't be only about design, techniques, and building. It is important that students gain an understanding beyond design and the hands-on aspects of the technology education shop/classroom. By putting more emphasis on connecting students to their work in a way that also finds connections with others, both in and out of the shop, learners gain an opportunity to see their work through a wider lens and greater opportunities for meaningful reflection of learning. This could mean, for example, students getting feedback from Elders or community members or connecting their project to a local problem or historical context.

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MEMORY, HISTORY, AND STORY

Learning is embedded in memory, history, and story

Traditionally Indigenous culture and knowledge is shared through oral means. This method of communication often takes the form of storytelling, sometimes utilizing metaphor or symbolism, to express community values, news, skills, histories, family record, and to explain the natural world.

Teaching through storytelling

The act of storytelling as a way of passing on information is very often already a part of many school shops and classrooms. Taking the time to share a personal story that is connected to a lesson can help create a real-world connection for students. As many teachers, and certainly students, are aware, an exciting story can turn a dull lesson into something fun and exciting. It can open student's imaginations and get them engaged with the lesson in a way they may have not done otherwise.

Student connection through storytelling

Offering students an opportunity to share their stories fosters a potentially greater connection to their work/learning as well as to their peers. By openly encouraging students to share their thoughts and connections to the lesson, educators do all within the classroom a service in fostering classroom community.

Learning/talking circles

One method that can be employed by educators is the learning circle. A learning circle can take many forms. One simple form is to have students sit in a circle and take the time to discuss a topic as a group related to the learning. For example, if the class will be learning wood carving, having a learning circle with a focus on patience

and mindfulness could be beneficial. Wood carving is best done when the mind is on the task at hand and not rushed. This learning circle example allows students to share stories of failures and successes in patience/mindfulness and perhaps learn from each other the importance of said topics. Learning circles do require class buy in and may require teacher motivated questions and prompts to get things started. They can take as long as they need to and sometimes might end on a completely different subject than what was initially started with. This is not necessarily a bad thing depending on the direction students take the discussion.

Elders and stories

Elders and Knowledge Keepers may share stories with students if invited into the classroom/shop. It should be noted that not all stories are to be repeated outside the context of the moment or to be retold by student or teacher without the Elder's permission. Further, many Indigenous stories do not come with a ready presentable moral like many Western fables do. It may be up the students/teacher to reflect on the story and reach their own conclusions of its meaning.

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PATIENCE AND TIME

Learning involves patience and time

It takes time and patience to reach understanding when attempting to learn. Every human is different and learns in their own way and in their own time. Teachers must recognize this and apply it to their teaching and assessment methods.

Every student learns in their own time

The BC school system sometimes does not meet its student's needs due to its time-based nature (i.e. reporting periods and course timeframes). Many schools have curricular learning goals based on age that may not suit every student's needs or development. An incomplete design or project does not necessarily mean learning didn't take place or that the student didn't put in their best effort. It can be difficult to do but finding where a student is in their development and working from there is in the best interest of the student. Although the school system often sets age standards for learning, they are not always accurate and can sometimes be detrimental to a student's ability to learn and their mental/emotional wellbeing. Learning happens when a person is ready, and the context is right.

Often a mentality many technology education teachers have, many coming from industry, is that students need to work hard, quickly, and consistently. It can be challenging when students do not "produce" learning and projects at the speed the teacher is hoping for. It is important to remember that students learn and work at their own speeds and a flexible schedule is required for many students learning. This doesn't necessarily mean there shouldn't be a deadline, but there should not be penalties for missing that deadline.

Addressing learning needs in the shop/classroom

Information should be revisited and re-evaluated at different times, exploring various points of view and contexts. Repetition is often key to learning as sometimes the first time (or other times thereafter) isn't the right time. One problem that many technology education teachers run into in their shops/classrooms is budgetary restrictions. Often getting a second or third try at something becomes financially restrictive and teachers may hesitate to offer students another attempt. For many technology education teachers this situation is less than ideal and can be difficult to navigate. It may require the project/lesson to shrink in size/scope or take on a new direction completely to get around the resource shortfall. Students could also be partnered with other students who are strong in areas that they are weak, so that they may learn from each other's strengths. This also can open an opportunity for students to teach one another, better learning the material, and form a bond through their learning.

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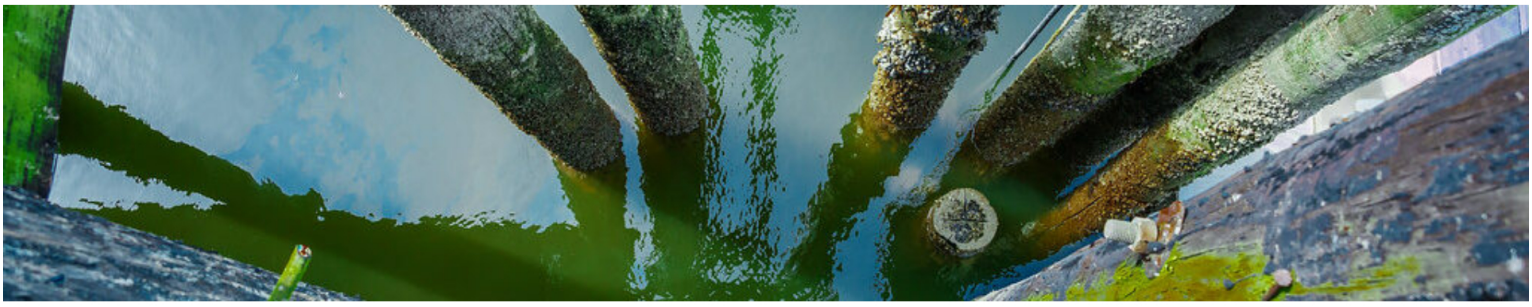

EXPLORATION OF ONE'S IDENTITY

Learning requires exploration of one's identity

One of the great things about technology education is it can be very open to students exploring design and new skills through discovering and expressing their identity. If a projects design and scope is created to allow safe opportunities for students to explore their identities, a higher level of student engagement and learning may be reached.

Exploring Indigenous identity

To build on the community and identity focus, there should be room made for students, both Indigenous and non-Indigenous, to explore Indigenous technologies. Indigenous technology has many roles in technology education curriculum, such as addressing misconceptions and misunderstandings about Indigenous people, connecting teaching and learning to home and community, restoring and affirming Indigenous identity and culture, creating collaboration between Indigenous and non-Indigenous learners, and recognizing Indigenous technologies contribution to the economy and society (Gumbo, 2015). When technologies, processes, and technology education curriculum are explored in differing contexts and cultural views there exists a high potential to discover the values hidden in their design (Seemann, 2009). These insights of a technologies maker and user lead to explain why some technologies ultimately fail and others have a great impact. By opening projects up for learners with a community-based focus, educators offer students a unique opportunity to better connect with themselves, local technologies, businesses, parents, Elders, the land, and the community at large to discover their needs and the social expectations expected of them, all aspects contributing to one's identity.

Exploring non-Indigenous identity

Exploring non-Indigenous identity

The above process can also be utilized in the same manner to explore non-Indigenous student's identities, histories, and connections. Opening the design process and projects to all types of backgrounds and ways of thinking can effectively create a culturally responsive pedagogy, allowing students to find confidence in their identity and discover others points of views.

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Attributions

SOME KNOWLEDGE IS SACRED AND ONLY SHARED WITH PERMISSION AND/OR IN CERTAIN SITUATIONS

Learning involves recognizing that some knowledge is sacred and only shared with permission and/or in certain situations

For many non-Indigenous educators, the idea of sharing Indigenous knowledge and implementing it in the classroom can be scary to the point of preventing them from moving towards an Indigenous education model. The thought of sharing the wrong information or not knowing the correct protocols can lead to educators stopping before they ever begin. To overcome these fears, educators will need to educate themselves in proper protocols with their local Indigenous community.

Credible resources are important

It is important to be sure that Indigenous knowledge comes from well-respected Elders and Knowledge Keepers that have credibility within their community (Wemigwans, 2018). These rigors protect the knowledge, aid in maintaining authenticity, and gives true value to the Indigenous knowledge being shared with the community and students (Smith, 1999). By authenticating the sources of information with the local Indigenous community, educators will have a greater peace of mind when working within an Indigenous education perspective.

Elders and sacred knowledge in the classroom/shop

By bringing in Elders and Knowledge Keepers into the classroom/shop, educators offer a different perspective for many students and an opportunity for intergenerational sharing and interaction. It is possible, when bringing in Elders and Knowledge Keepers, that they may need or wish to share sacred knowledge. Sacred

Knowledge Keepers, that they may need or wish to share sacred knowledge. Sacred teachings are traditional knowledge that are passed on to others through ceremonial protocols by Elders, traditional teachers, and Knowledge Keepers. The Indigenous knowledge they hold and share is held in trust for the community with the expectation that they abide by their knowledge's cultural protocols (Wemigwans, 2018). Sacred knowledge differs from personal knowledge, which is not bound by community protocols like sacred teachings. It is acquired by the individual through educational pursuits, natural talents, personal experiences, and spiritual knowledge learned through dreams, visions, intuitions, and meditation (Wemigwans, 2018).

Some educators may be hesitant to introduce information/knowledge or acts that they deem to be potentially religious in nature into their classroom. The public-school system has made a concerted effort to keep religion/spirituality out of the classroom. The preparations, ceremonies, and rituals required when learning some Indigenous knowledge may create an issue for some educators and administration. This problem may be addressed by approaching Indigenous knowledge as a way of knowing and not as religious content which would likely create barriers to teaching Indigenous knowledge in public schools (Battiste, 2013). Exploring Indigenous knowledge in the classroom was challenged and struck down in the court case *Servatius v. Alberni School District No. 70* (Thompson, 2020), where it was deemed that a smudging ceremony which took place in a Port Alberni, BC school was not a religious act but a cultural one. This precedent confirms Battiste's assertion and may give some educators peace of mind when exploring these types of learning experiences.

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STRATEGIES

This section is a guide on implementing Indigenous education into the classroom and shop. It presents ideas and examples of ways in which educators can best offer Indigenous and non-Indigenous students a broader, more culturally sensitive, education. The ideas and examples offered in this section are merely examples. For truly accurate methods of Indigenous education integration, teachers should connect with their local Indigenous communities and confirm what they wish to do is appropriate and the information being presented is accurate. It should also be noted that not all information should be shared freely as some knowledge may be considered sacred.

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Attributions

RELATIONAL AND INTERGENERATIONAL

Invite Elders and Knowledge Keepers into the classroom/shop

Inviting Elders and Knowledge Keepers into the classroom can create many benefits for students. An Elders presence can help Indigenous students feel more connected to the school and their community. Further, it can create a mutually beneficial relationship between students and Elders where students aid Elders when in need and Elders offer stories and lessons. Elders and Knowledge Keepers in the classroom present an opportunity:

- for students to form relationships with an older generation and to learn from their experiences, skills, and stories. For example, creating a class discussion about how life and technologies have changed since the Elder's youth and how those changes have affected their life.
- to connect Indigenous skills and knowledge to real life applications. For example, Elders and Knowledge Keepers may share their skills and knowledge on drum making or cedar weaving and connect those things to todays world and culture, as well as provide historical context with local connections.

To connect with Elders and Knowledge Keepers, contact your school or district Indigenous education department. If those do not exist in your location, the Elders in Schools Handbook is a great resource to point educators, administrations, and districts in the right direction to start making connections and address proper protocols when inviting Elders into the classroom/shop.

Invite parents and other community members into the classroom/shop

Opening the classroom to outside experiences from parents and other community

members creates an opportunity for students to learn from local people and give lessons with real life context, consequences, and local connection. It demonstrates to students that the school is not a shut off place where learning is disconnected from the rest of the world but is in fact real and meaningful. Some methods to approaching this are:

- inviting parents/community members to share their experiences in their careers which may or may not be related to the class subject/lesson.
- inviting parents/community members to work directly with students to aid in their research, design work, and hands-on applications.
- inviting local community members/businesses to connect with students to design/create something of meaning for/to the local community.

Maintain strong relationships with students' family

Keeping in regular contact with a student's family is important in student and community growth. Open communication between teacher, student, and parent/guardian allows for a united front in addressing the best learning methods for a student. Gaps in learning can better be filled and parents will be given the chance to aid their child in the learning process when not at school. It should be noted that in the teenage years some students may not want their parent's involvement in their learning and that should be respected.

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THEME BY ANDERS NORÉN — UP ↑

NARRATIVE (STORYTELLING)

Lessons through stories

This teaching method can act as a continuation of the "Relational" points, having outside community members in the classroom. Stories can engage students, improve listening skills, and help grow the classroom community in a positive way. Further, they act as an entertaining method to explore varying outlooks of the world, its histories, and its peoples. Stories as a learning tool can:

- be used by anyone (teacher, student, community member, Elder, etc.) and make a great entertaining way to connect a lesson to real life. Stories can be drawn from real lived experiences which can demonstrate lessons through other's actions. The more connected the story is to the lives of the students and in a local context, the greater potential for connection.
- demonstrate a lesson through metaphors or symbolism, often depicting histories, lineages, folklore, and exploring the consequences of one's actions in a fun and engaging way. Many societies, including Indigenous ones, share stories to pass on information from generation to generation.

Elders and Knowledge Keepers and stories

Inviting Elders and Knowledge Keepers into classrooms/shops to share stories and lessons can connect Indigenous and non-Indigenous students to the local indigenous peoples while teaching valuable life lessons. Elders/Knowledge Keeper stories can:

- help break down stereotypes and walls between communities and make room for more mutual understanding and care.
- share stories and lessons from a local Indigenous point of view, creating an opportunity to explore learning outside a Western scope.

Elder's and Knowledge Keeper's stories may not have a ready moral or summary given at their story's conclusion, unlike many Western style fairy tales. Students should be made aware that it may be expected of them to think on the story and draw their own conclusions and meanings.

It should be noted that some stories and lessons told by Elders and Knowledge Keepers are considered sacred and should not be shared by others. They should not be repeated or recorded unless permission is given. Sacred teachings are traditional knowledge that are passed on to others through ceremonial protocols by Elders, traditional teachers, and Knowledge Keepers. The Indigenous knowledge they hold and share is held in trust for the community with the expectation that they abide by their knowledge's cultural protocols (Wemigwans, 2018). Sacred knowledge differs from personal knowledge, which is not bound by community protocols like sacred teachings. It is acquired by the individual through educational pursuits, natural talents, personal experiences, and spiritual knowledge learned through dreams, visions, intuitions, and meditation (Wemigwans, 2018).

Learning/talking circles and story telling

Learning/talking circles are a method for students to hear/see each other as equals and share their thoughts and feelings on a particular topic (context and course dependent). They can be used to accomplish many goals from peer/self assessment, to project/lesson debriefing, to discussing pertinent topics related to a project/lesson. A basic format for a learning/talking circle is as follows:

- have students to sit in circle so that all are positioned in a way that all are equal, and all can be seen/heard by everyone else. This practice creates an environment for students to share thoughts/stories/experiences and reflect on their work with their peers in a non-judgemental manner.
- the teacher or group leader introduces a topic to be discussed. The subject should be explained by the leader/teacher if it requires some clarification or setup.
- an object is sometimes used to demonstrate who is currently supposed to be talking. Only the object holder may speak while everyone else listens intently. This will help prevent side conversations or people speaking over each other.
- everyone should get an opportunity to speak if they wish to or pass if they don't. The object can be passed around multiple times so that everyone gets a chance to speak their mind.

It should be known by participants that all opinions and speaking time in the circle need to be respected. Also, students should not share information spoken about in the circle outside of the classroom, respecting the thoughts and feelings shared by others in a moment that should feel safe and caring.

Example: a learning circle could be used before a session of hand carving. The subject discussed could be the importance of being patient or mindfulness, both

skills that can be helpful in preventing injury and mistakes when carving. Students can share stories of when patience was needed in their lives or when keeping their attention on the task at hand was important. Often it is good practice for the teacher/leader to start off the circle to set the pace and expectations.

More information on learning/talking circles can be found at First Nations Pedagogy.

References Cited

Attributions

EXPERIENTIAL

Hands-on learning

The technology education curricula generally encourage the use of hands-on learning through exploring the design process and using various machines and tools to create projects and artifacts. Because of this, hands-on learning is already a part of many classrooms and shops. A great way to approach hands-on learning is through students designing and creating via projects. Project-based learning allows students to explore designs and ideas and learn new skills all while working towards one final goal.

Example: Robotics challenges offer students a great opportunity to explore various design ideas and principles while learning various scientific concepts and implementing tool and machine use. Students can build a robot towards a goal or challenge, working through the design process multiple times to create the best robot they can to complete said challenge. Further, they can attempt this challenge as an individual or in a group, sharing strengths and weaknesses and learning how to effectively work with others to reach a mutual goal.

Connect students to local work and volunteer experiences

Connecting students to local opportunities can aid them in finding where their passions lie and what sort of career/work they may be interested in doing in their future. Jobs and volunteer work can connect the student to the community as they make new relationships with coworkers, bosses, and customers. Volunteer work is especially important as it is often done with the goal to better the local community and help people or groups that may not be able to do so on their own. This can lead to new local relationships being formed and to personal growth for the student as they meet new various people with different backgrounds and ways of living/being.

Many high schools have a “careers” focused entity within the school/district. If this is not the case, it may require teachers taking on that role to initially make connections for students.

Offer students the opportunity to experience Indigenous culture and ways of knowing in a practical way

This can be done by:

- introducing the First Peoples Principles of Learning into your classroom lessons and projects.
- inviting Elders and Knowledge Keepers into the classroom to aid students in their work or share valuable insights with them.
- exploring current and historical Indigenous technologies. Through analyzing their design and how they were created, students will better understand their use and cultural context/importance.
- having students design and build their own version of an Indigenous technology.
- exploring Indigenous created technologies, such as tools, housing, clothing, transportation, food, and design/arts. This can take the form of comparing and contrasting two or more technologies, noting their advantages and disadvantages, and delving into why the technologies may have been designed the way they were/are and their historical/cultural significance.

The more of these points that are covered in the shop the greater the Indigenous education inclusion will be and the more authentic and engaging it will be for students of all backgrounds.

References Cited

Attributions

LAND-BASED

Explore issues of land and sustainability

All technologies have positive and negative aspects which students can analyze and study as part of the learning process and for future design iterations. This deeper analysis of technologies advantages and disadvantages would greatly aid in ushering in a future where designers and developers will approach their work through a lens of responsibility regarding sustainability and environmental/ecological awareness and be in line with Indigenous teachings regarding issues of the land and sustainability. Focus on land and sustainability issues in technology education offers:

- a holistic, community, and environmentally focused approach to technological interaction within the technology education classroom/shop which could aid greatly in opening a different future for both Indigenous and non-Indigenous students, allowing for all peoples to share their culture and work towards a mutually beneficial future for all.
- to create an environmentally conscious classroom where educators prepare students to think critically about what they are designing and making, how they relate to themselves and their community, and the potential environmental ramifications they or others could create.

Examples: Students research how the local environment has changed throughout history and the connection(s) the technology may have had to that change. They can choose a technology used locally and research its evolution over time and its connection to the land and local environment. Identify local Indigenous practices and explore how new technologies may have changed those practices and discover the environmental impact those changes may have caused.

Practicing sustainability

Instead of just talking about sustainability, why not try and make a real-life difference? Encouraging students to participate in environmentally positive actions will help connect students to the land and give them a sense of ownership for their local environment. This can be done in ways such as:

- planting trees locally to offset the wood use from a woodwork course. A woodwork course uses many trees worth of wood for projects. Taking the time to have students plant some replacement trees can offset the wood used for the course.
- recycling electronics. This can have many benefits in an electronics or robotics course. Accepting electronics donations from the local community allows students to explore numerous technologies they may not have otherwise been able to look at. Students can harvest parts from the donations for other projects or fix/troubleshoot the device if it is not working. This may also present the opportunity to explore parts, components, devices, and technologies that a standard electronics/robotics class would not normally have access to. The remaining parts can be recycled at the nearest electronics recycling center.
- Exploring sustainable technologies and how they could be implemented in a local context. This can range from green houses for growing to electric vehicles to creating sustainable power systems (i.e. solar energy).

Explore local land and environment

The land and wildlife can also be teachers in their own way. Connecting students to them is important for their growth and understanding of the world around them. They are a place to relax, explore, and discover new things beyond what the classroom/shop can ever offer. Some approaches to connecting with the land and wildlife are:

- to take students to a local wild location and take the time learn the names and other information about trees, plants, and animals that you see. Students can take pictures or make sketches of what they see and later research what they are and what makes them unique and important to the ecosystem. (This may be dependent on where your school is located and the ability to transport students safely to a location off the school site.)
- explore nature at different times of the year, noting the changes that take place as the seasons progress. Discover the cyclical and interconnected ways nature and wildlife react to one another.

PROJECTS

Here you will find different examples of projects and lessons that can be used in the technology education classroom and shop. These examples may not be appropriate, nor their information accurate, outside of their local context and should be reviewed before use. It is highly recommended that teachers verify the information presented with their school or district Indigenous/Aboriginal education departments and with trusted members of the local Indigenous communities.

The examples provided are free to use by teachers and adapted by teachers under a creative commons license. It is asked that credit is given to the author and that the material is not commodified.

If you would like to submit a project or lesson, please view the Submissions page.

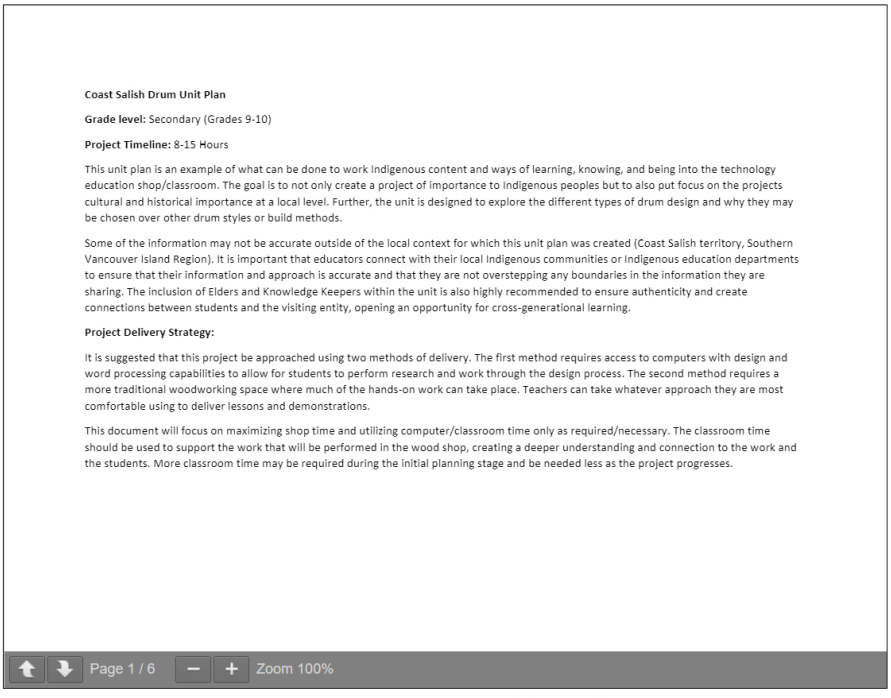
References Cited

Attributions

COAST SALISH DRUM

The following is a loose unit plan for creating a Coast Salish Drum with a woodworking class (Grades 8-12). The goal of this unit is to create a drum with a mallet/beater and explore drum makings historical and cultural connection to the local Indigenous communities. This is not a definitive unit plan as every Indigenous community is different and may have different beliefs and build techniques. It will need to be adapted based on those differing needs and traditions.

It is highly recommended to reach out to the local Indigenous communities and invite a trusted Elder and/or Knowledge Keeper into the classroom to add to the unit's authenticity and create a real connection for the students to the material, practices, and visiting community member.



Coast Salish Drum Unit Plan

Grade level: Secondary (Grades 9-10)

Project Timeline: 8-15 Hours

This unit plan is an example of what can be done to work Indigenous content and ways of learning, knowing, and being into the technology education shop/classroom. The goal is to not only create a project of importance to Indigenous peoples but to also put focus on the projects cultural and historical importance at a local level. Further, the unit is designed to explore the different types of drum design and why they may be chosen over other drum styles or build methods.

Some of the information may not be accurate outside of the local context for which this unit plan was created (Coast Salish territory, Southern Vancouver Island Region). It is important that educators connect with their local Indigenous communities or Indigenous education departments to ensure that their information and approach is accurate and that they are not overstepping any boundaries in the information they are sharing. The inclusion of Elders and Knowledge Keepers within the unit is also highly recommended to ensure authenticity and create connections between students and the visiting entity, opening an opportunity for cross-generational learning.

Project Delivery Strategy:

It is suggested that this project be approached using two methods of delivery. The first method requires access to computers with design and word processing capabilities to allow for students to perform research and work through the design process. The second method requires a more traditional woodworking space where much of the hands-on work can take place. Teachers can take whatever approach they are most comfortable using to deliver lessons and demonstrations.

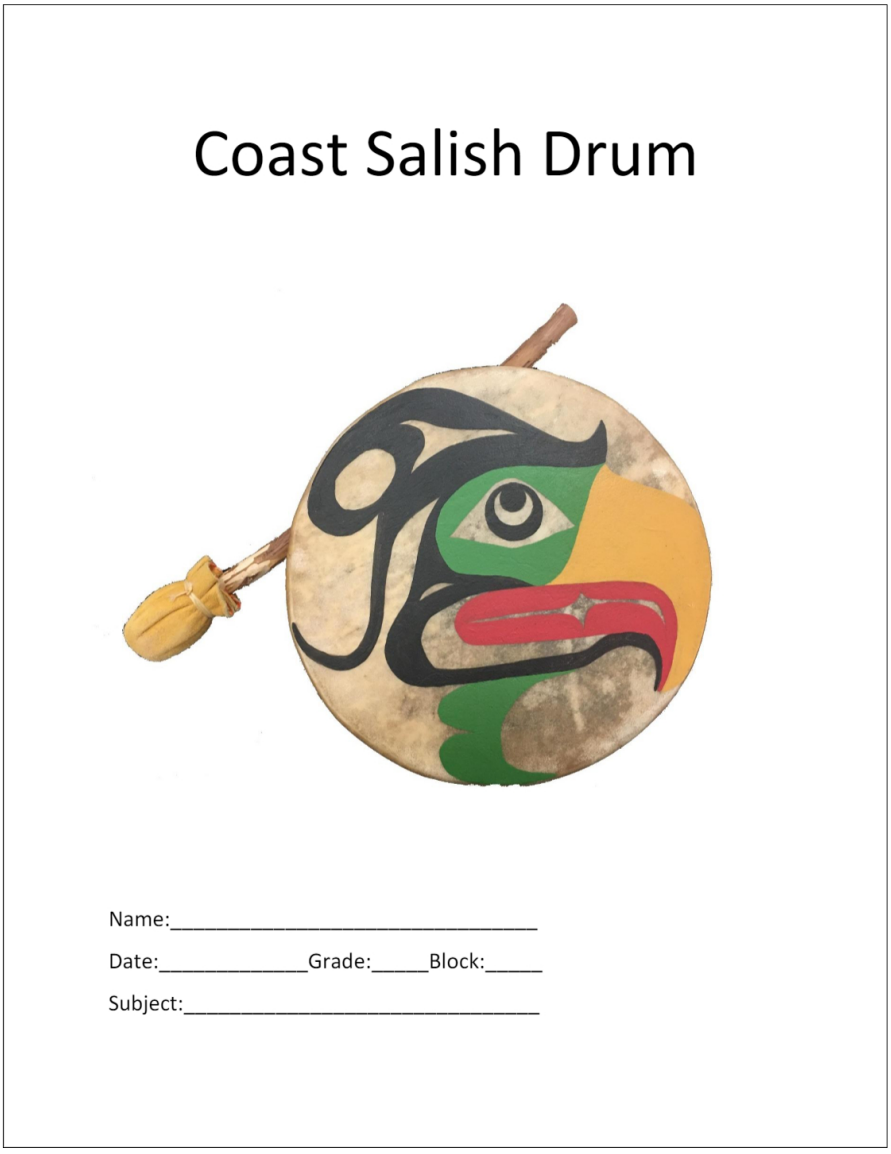
This document will focus on maximizing shop time and utilizing computer/classroom time only as required/necessary. The classroom time should be used to support the work that will be performed in the wood shop, creating a deeper understanding and connection to the work and the students. More classroom time may be required during the initial planning stage and be needed less as the project progresses.

Page 1 / 6 Zoom 100%

Download: Unit Plan – Coast Salish Drum (PDF) (Word)

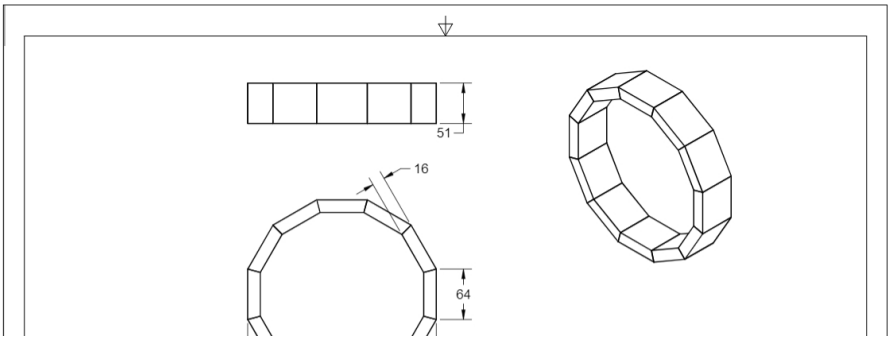
Download: Unit Plan – Coast Salish Drum (PDF) (Word)

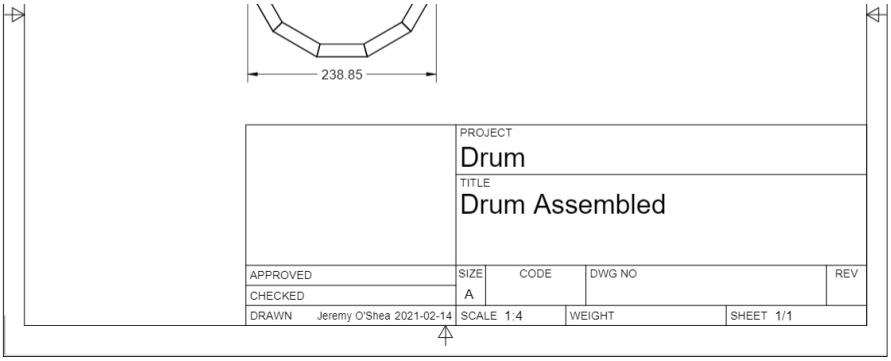
This is a step by step walkthrough of one way to build a drum shell. It may not be accurate for all locations and traditions and should be reassessed.



Download: Coast Salish Drum Instructions (PDF) (Word)

This is an example of computer generated plans that students could use an example. These plans may depend on the build method being used.





Download: Drum Assembled Drawing (PDF)

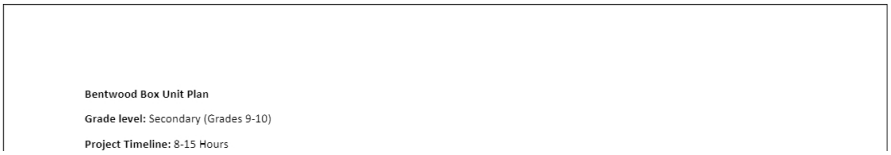
References Cited

Attributions

BENTWOOD BOX

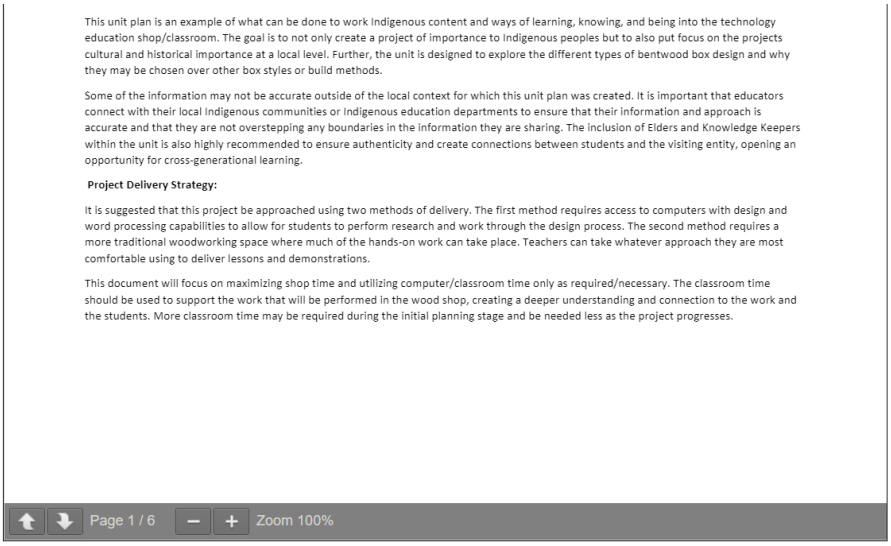
The following is a unit plan for creating a bentwood box with a woodworking class (Grades 8-12). The goal of this unit is to create a bentwood box and explore bentwood box makings historical and cultural connection to the local Indigenous communities. This is not a definitive unit plan as every Indigenous community is different and may have different beliefs and build techniques or may not have made bentwood boxes at all. It will need to be adapted based on those differing needs and traditions.

It is highly recommended to reach out to the local Indigenous communities and invite a trusted Elder and/or Knowledge Keeper into the classroom to add to the unit's authenticity and create a real connection for the students to the material, practices, and visiting community member.


Bentwood Box Unit Plan

Grade level: Secondary (Grades 9-10)

Project Timeline: 8-15 Hours



This unit plan is an example of what can be done to work Indigenous content and ways of learning, knowing, and being into the technology education shop/classroom. The goal is to not only create a project of importance to Indigenous peoples but to also put focus on the projects cultural and historical importance at a local level. Further, the unit is designed to explore the different types of bentwood box design and why they may be chosen over other box styles or build methods.

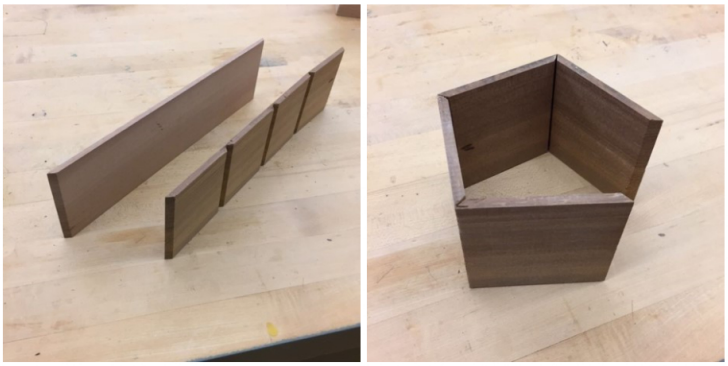
Some of the information may not be accurate outside of the local context for which this unit plan was created. It is important that educators connect with their local Indigenous communities or Indigenous education departments to ensure that their information and approach is accurate and that they are not overstepping any boundaries in the information they are sharing. The inclusion of Elders and Knowledge Keepers within the unit is also highly recommended to ensure authenticity and create connections between students and the visiting entity, opening an opportunity for cross-generational learning.

Project Delivery Strategy:

It is suggested that this project be approached using two methods of delivery. The first method requires access to computers with design and word processing capabilities to allow for students to perform research and work through the design process. The second method requires a more traditional woodworking space where much of the hands-on work can take place. Teachers can take whatever approach they are most comfortable using to deliver lessons and demonstrations.

This document will focus on maximizing shop time and utilizing computer/classroom time only as required/necessary. The classroom time should be used to support the work that will be performed in the wood shop, creating a deeper understanding and connection to the work and the students. More classroom time may be required during the initial planning stage and be needed less as the project progresses.

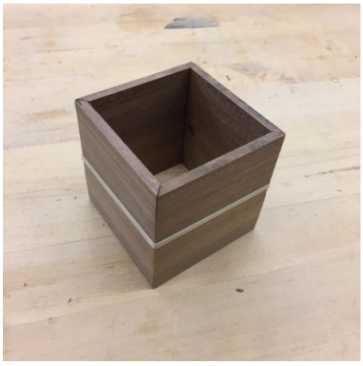
Download: Unit Plan – Bentwood Box (PDF) (Word)

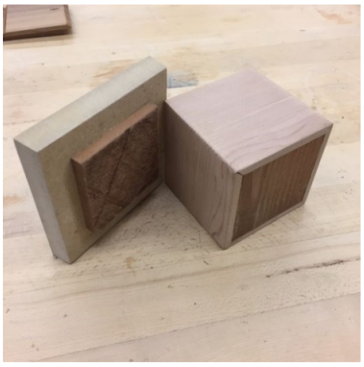


This is a step by step walkthrough of one way to build a bentwood box. It may not be accurate for all locations and traditions and should be assessed for local connection, if any.

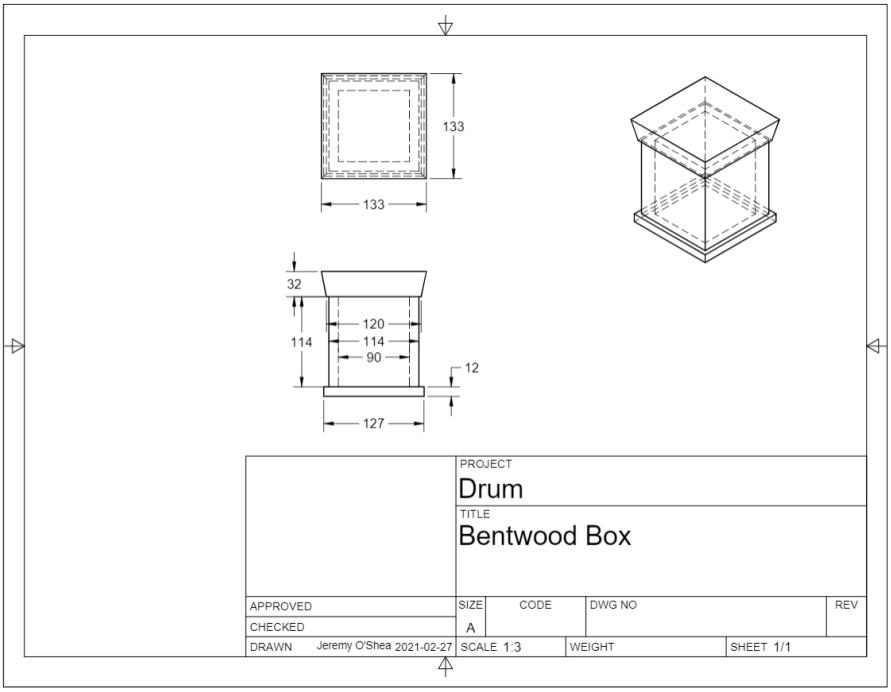
Name:_____
Date:_____Grade:_____Block:_____
Subject:_____

Download: Bentwood Box Instructions (PDF) (Word)





This is an example of computer generated plans that students could use an example. These plans may depend on the build method being used.



Download: Bentwood Box Drawing (PDF)

RESOURCES

The links under this menu tab are resources for technology education teachers to use to better Indigenous inclusion in their shop or classroom. The links have no direct or monetary connection to this site. If any sites are no longer working or you have other sites you feel would be valuable to others, please connect with me by clicking contact.

References Cited

Attributions

CURRICULUM AND TEACHING STRATEGIES

First Peoples Principles of Learning

This site is created to help educators in British Columbia understand how they might incorporate the First Peoples Principles of Learning (FPPL) into their classrooms and schools.

Shared Learnings: Integrating BC Aboriginal Content K-10

A resource covering integrating Indigenous Education into multiple BC curricula. It's a little dates (2006) but still relevant.

Think Before You Appropriate

A guide to help teachers and students to avoid misappropriating Indigenous cultures

Indigenous Knowledge and Perspectives in K-12 Curriculum

Has documents which reflect implicit and explicit references to Indigenous Knowledge and Perspectives throughout the K-12 Curriculum. Educators may use this resource to easily access where Indigenous Knowledge and Perspectives intersect with the curriculum in every area of learning at every grade level.

The National Centre for Collaboration in Indigenous Education

The National Centre for Collaboration in Indigenous Education connects communities with each other to share their stories about Indigenous education across Canada and around the world.

Beyond Words: Creating Racism-Free Schools for Aboriginal Learners

A BCTF created resource exploring racism in the school system and its affect on Indigenous communities and peoples.

Science First Peoples Teacher Resource Guide

This resource provides educators with resources to support the integration of the rich body of First Peoples (unappropriated) knowledge and perspectives into secondary Science classes (as well as other curricular areas).

First Nation Pedagogy

This site provides best practices and support for online learning initiatives that are

intended for Indigenous students, Elders, educators, curriculum developers, and educational leaders.

References Cited

Attributions

BOOKS

Strong Nations

An online Indigenous focused bookstore featuring many insightful and helpful books focused on Indigenous education and other Indigenous focused topics.

A Digital Bundle: Protecting and Promoting Indigenous Knowledge Online

by Jennifer Wemigwans

A Digital Bundle frames digital technology as an important tool for self-determination and idea sharing, ultimately contributing to Indigenous resurgence and nation building.

Cedar: Tree of Life to the Northwest Coast Indians

By Hilary Stewart

This book explores the tools and techniques used, as well as the superbly crafted objects and their uses, all in the context of daily and ceremonial life. Anecdotes, oral history and the accounts of early explorers, traders, missionaries, and native elders highlight the text.

Decolonizing Education: Nourishing the Learning Spirit

by Marie Battiste

Battiste documents the impacts of Canada's Eurocentric education model on Indigenous knowledge and suggests a new approach to education.

Indian Fishing: Early Methods on the Northwest Coast

by Hilary Stewart

An assemblage of tools, techniques and knowledge, the culmination of thousands of years of evolutionary development. Indian Fishing is more than a bare account of the technology of fishing; it is about fish and fishing in the total lives of the Northwest Coast people.

Learning and Teaching Together: Weaving Indigenous Ways of Knowing into Education

by Michele TD Tanaka

This book opens a path for teachers to nurture indigenist cross-cultural understanding in their classrooms.

Learning by Designing Pacific Northwest Coast Native Indian Art, Volume 1

by Jim Gilbert and Karin Clark

A reference and instruction manual with a detailed, thoroughly analyzed, well-supported comparison of four Pacific Northwest Coast First Nations art styles.

Learning by Designing Pacific Northwest Coast Native Indian Art, Volume 2

by Jim Gilbert and Karin Clark

This companion manual to Volume 1 puts First Nations Northwest Coast art into deeper cultural context, providing Indigenous philosophy, knowledge, and skills foundation, a code of ethics, and interviews with First Nations community members.

Learning by Doing Northwest Coast Native Indian Art

by Karin Clark and Jim Gilbert

Contains step-by-step instructions and illustrations on the basics of drawing, designing, painting, and carving in the Pacific Northwest Coast Native Indigenous art style

Pacific Northwest Coast Native Art in Marquetry

by Paul R. Dean

This book serves as an introduction to people interested in using marquetry to recreate Pacific Northwest Coast Native Indigenous art style designs.

Understanding Northwest Coast Indigenous Jewelry

by Alexander Dawkins

Providing a step-by-step overview of various techniques, the book also introduces the specifics of formline design, highlights the traits of the most common animal symbols used, offers tips for identification, and features biographies and works from over fifty of the Coast's best-known jewelers. Finally, it delves into the history of the art form, from the earliest horn and copper cuff bracelets to cutting-edge contemporary works and everything in between.

PODCASTS

All My Relations Podcast

An exploration of Indigenous relationships to the land, animals, and one another.

Face to Face

An interview show focusing on Indigenous issues.

Indigenous 150+

Conversations with knowledge keepers, community leaders, artists and influencers who share their stories.

Introduction to Indigenous Relations In BC

This eight episode podcast is a condensation of the "Indigenous Relations in British Columbia" workshop Peter Walters has given to non-profit groups, government agencies, and the private sector.

Media Indigena with Rick Harp

A weekly roundtable about Indigenous issues and events in Canada and elsewhere.

Nation to Nation

A look at politics affecting Indigenous peoples in Canada.

Unreserved

Explores Indigenous community, culture, and conversation.
Episode Example: 'There's no quick fix': Advice for teachers struggling to properly integrate Indigenous content into classes

EXAMPLES OF INDIGENIZED TECHNOLOGY EDUCATION

Educator hopes incorporating traditional knowledge will draw more Indigenous students to STEM

An example of Indigenous education and STEM learning working together.

Canoe carving project brings youth closer to their culture

Master carvers teach youth of the Westbank First Nation how to carve a canoe from a cottonwood log.

These students spent 300 hours welding metal into a red dress sculpture honouring MMIWG

Two Grade 12 students are use metalwork as their medium to raise awareness about missing and murdered Indigenous women and girls.

Reconciliation Canoe

This canoe carving project was developed in partnership with the residents of Powell River and the Tla'amin Nation and aims to create a more meaningful understanding of reconciliation through community participation.

References Cited

Attributions

OTHER RESOURCES

National Film Board

An archive of numerous films, many focused-on Education and Indigenous issues.

First Nations Education Steering Committee

The First Nations Education Steering Committee (FNESC) is a policy and advocacy organization that represents and works on behalf of First Nations in British Columbia. FNESC has a mandate to support First Nations students and advance First Nations education in BC.

Indiginews

IndigiNews is dedicated to covering the news in a way that allows for local community stories to be heard, understood, and respected. They aim to produce valuable, relevant, and trustworthy content by listening to the communities they serve through their work.

First Peoples' Map

The First Peoples' Map can be used to view Indigenous language regions, artists and artworks, place names and community landmarks. You can hear the pronunciation of language names, greetings, places and more. All of the 34 languages Indigenous to what is now called British Columbia are represented.

SUBMISSIONS

This website welcomes submissions, additions, and modifications of any work(s) created for the purpose of furthering the integration and inclusion of Indigenous education in technology education. Please submit your work below and provide some context of the material. I thank anyone who is willing to share their work and help this website be more relevant and grow.

Name

First **Last**

Email

File

Choose File No file chosen

Comments

Submit

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ATTRIBUTIONS

Welcome

"Muncho Lake – British Columbia" by petechar is licensed under CC BY-NC 2.0

Why Indigenize Shop?

"Stegyawden (also known as Hagwilget Peak and the Roche de Boule mountain range) looking across the Bulkley River near its confluence with the Skeena River, Hazelton British Columbia, Canada." by brodieguy is licensed under CC BY-NC-ND 2.0

About Author

"Forest, British Columbia, Canada" by R. V. is licensed under CC BY-NC-SA 2.0

First Peoples' Principles of Learning

"Whistler British Columbia 7-17-05" by bfraz is licensed under CC BY-NC-SA 2.0

The Self, Family, Community, Land, Spirits, and Ancestors

"Stawamus Chief, Squamish, British Columbia" by Thomas Shahan 3 is licensed under CC BY 2.0

Holistic, Reflexive, Reflective, Experiential, and Relational

"Takkakaw Falls – Yoho National Park, British Columbia" by get in touch from time to time is licensed under CC BY-NC-ND 2.0

Consequences of One's Actions

"Emerald Lake – British Columbia, Canada – Landscape photography" by Giuseppe Milo (www.pixael.com) is licensed under CC BY 2.0

Generational Roles and Responsibilities

"Mountains of British Columbia …" by sswj is licensed under CC BY-NC-ND 2.0

The Role of Indigenous Knowledge

"From Stanley Park in Vancouver, British Columbia, Canada (April 2016)" by @CarShowShooter is licensed under CC BY-NC-SA 2.0

Memory, History, and Story

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Patience and Time

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Exploration of One's Identity

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Projects

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Coast Salish Drum

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Bentwood Box

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4 pictures of the bentwood box process by Jeremy O'Shea, licensed under CC BY-NC-ND 2.0

Resources

"Helliwell Park, Hornby Island, British Columbia: HDR (from single RAW) III – Sony A-200 with Sony 18-70 mm Zoom" by Logos: The Art of Photography is licensed under CC BY-NC-SA 2.0

References Cited

Attributions

THEME BY ANDERS NORÉN — UP ↑

Coast Salish Drum Unit Plan

Grade level: Secondary (Grades 9-10)

Project Timeline: 8-15 Hours

This unit plan is an example of what can be done to work Indigenous content and ways of learning, knowing, and being into the technology education shop/classroom. The goal is to not only create a project of importance to Indigenous peoples but to also put focus on the projects cultural and historical importance at a local level. Further, the unit is designed to explore the different types of drum design and why they may be chosen over other drum styles or build methods.

Some of the information may not be accurate outside of the local context for which this unit plan was created (Coast Salish territory, Southern Vancouver Island Region). It is important that educators connect with their local Indigenous communities or Indigenous education departments to ensure that their information and approach is accurate and that they are not overstepping any boundaries in the information they are sharing. The inclusion of Elders and Knowledge Keepers within the unit is also highly recommended to ensure authenticity and create connections between students and the visiting entity, opening an opportunity for cross-generational learning.

Project Delivery Strategy:

It is suggested that this project be approached using two methods of delivery. The first method requires access to computers with design and word processing capabilities to allow for students to perform research and work through the design process. The second method requires a more traditional woodworking space where much of the hands-on work can take place. Teachers can take whatever approach they are most comfortable using to deliver lessons and demonstrations.

This document will focus on maximizing shop time and utilizing computer/classroom time only as required/necessary. The classroom time should be used to support the work that will be performed in the wood shop, creating a deeper understanding and connection to the work and the students. More classroom time may be required during the initial planning stage and be needed less as the project progresses.

Unit Topic: Coast Salish Drum

BC Ministry Woodwork 10 Learning Outcomes	
Big Ideas	• User needs and interests drive the design process. • Social, ethical, and sustainability considerations impact design. • Complex tasks require different technologies and tools at different stages.
Applied Design	• **Understanding context** - Engage in a period of research and empathetic observation • **Defining** - Identify potential users and relevant contextual factors for a chosen design opportunity and identify criteria for success, intended impact, and any constraints • **Ideating** - Identify and use sources of inspiration and maintain an open mind about potentially viable ideas • **Prototyping** - Choose a form for prototyping and develop a plan that includes key stages and resources and evaluate a variety of materials for effective use and potential for reuse, recycling, and biodegradability • **Testing** - Conduct the test, collect, and compile data, evaluate data, and decide on changes • **Making** - Identify and use appropriate tools, technologies, materials, and processes and use materials in ways that minimize waste • **Sharing** - Decide on how and with whom to share product and processes and demonstrate product to users and critically evaluate its success
Applied Skills	• Develop competency and proficiency in skills at various levels involving manual dexterity and woodworking techniques • Identify the skills needed, individually or collaboratively, in relation to specific projects, and develop and refine them
Applied Technologies	• Evaluate impacts, including unintended negative consequences, of choices made about technology use • Evaluate the influences of land, natural resources, and culture on the development and use of tools and technologies
Content	• Project design opportunities • importance of woodwork in historical and current cultural contexts of First Nations, Métis, or Inuit communities, and other cultural contexts • ethics of cultural appropriation in design process • identification, characteristics, properties, and uses of wood from various species • choices related to the sustainable use of wood • uses and creation of plans and drawings • techniques for stock breakout and woodworking using a variety of tools and equipment, including stationary power equipment • function, uses, and role of portable and stationary power equipment in the creation of a project • function and use of hand tools

Lesson(s)	Objectives	Materials	Activities	Assessment
1. Research and preparation	• Demonstrate proper cultural respect • Create a plan to budget and build the drum	• Classroom • Pencils and erasers • Graph paper • Access to computers	Class brainstorm: • How to respectfully address another person's culture. Methods and Protocols (in talking circle). • Online research of different drum designs • Materials (cedar and hide) and Budgeting. Cost & where to get them. • Making plans. Diameter, depth of drum shell	• Student made plans and budgeting
2. Creating Plans	• Design and create plans	• Computers with CAD program or graph paper with rulers and pencils	• Brainstorm design - consider diameter, depth of drum compared to material constraints • Create plans using CAD programs or by hand using orthographic drawing format	• Created plans and design sketches
3. Drum Shell	• Create a drum shell using wood shop machines and tools in a safe manner	• Access to an equipped Wood shop with machines and tools needed for project. • Cedar 1"x6" boards for class	• Demonstrate steps and machines necessary to create drum shells • Use **Coast Salish Drum plans** or self-made plans to create drum shells	• Teacher will observe students as they work and question their understanding of the machines and used processes
4. Hide Preparation	• Prepare a hide for drum making • Layout drum hide's diameter and hole locations	• Computer(s) • projector • Large containers • Hides • Water • Large compasses	• Show video below: https://www.youtube.com/watch?v=3uzmBCZUx0w • Teacher demonstrates the below and then students do as they were shown: • Set up containers, fill with water, and submerge hides in containers • Let hides soak overnight • Layout and cut circle in hide • Punch holes • Cut hide strip or prepare paracord	• Teacher will observe students as they work and question their understanding of the tools and used processes

		• Pencils, scissors, and punches		
5. Attaching hide and shell	• Thread their drum • Wrap their drum's handle • Hang their drum to dry	• Computer(s) • projector • Large containers • Hides • Water • Large compasses • Pencils, scissors, and punches	• Show video below: https://www.youtube.com/watch?v=3uzmBCZUx0w • Teacher demonstrates the below and then students do as they were shown: • Thread drum • Wrap handle • Hang drums to dry when finished	• Teacher will observe students as they work and question their understanding of the tools and used processes • Completed drum
6. Mallets	• Design and create their own drumming mallet	• Sticks • Extra hide • Sinew or string	• If possible, take students for a local walk • Find sticks that feel sturdy and fit well in the hand • Wrap head of stick in extra hide to make mallet head	• Teacher will observe students as they work and question their understanding of the tools and used processes • Completed mallet
7. Reflective discussion	• Assess work through self/peer/teacher assessment	• Classroom • Student projects	In a talking circle discuss: • Design (changes or alterations?) • Analyzing woodworking techniques learned and used (for the project and historically) • Students showcase their work • Self/peer/teacher assess work	• Assessment discussion with class (self, peer, teacher).

Note: Ideally, an Elder or Knowledge Keeper's participation in this project will add greater authenticity, connection, and cultural understanding for students. Indigenous drums and drumming are not a homogenous thing. Getting a local context will provide local context for the project and give it more relevance. An invited guest may also be willing to lead students in a song (but don't expect that without previous communication on the matter).

Project Portfolio: Students should have at the end of the project – Drum hide design sketches, CAD or hand drawn plans, completed drum and mallet, performed a self and peer assessment.

Projects Parameters (Constraints, Expectations, and Showcase):

- Constraints: Materials (cedar wood or other wood of choice, hide, glue, tape, & possibly paracord rope to replace hide strips), budget (Materials can be costly and should be budgeted), and timeline
- Expectations: Students will produce proof of research, design sketches, plans, a drum, and mallet. They are expected to participate in group discussions and honestly assess their own work as well as others.
- Showcase: Students will share their work with the class during a talking circle concluding the project. They will be expected to discuss their processes, design choices, and triumphs and struggles.

Adaptations & Modifications: Accommodations that can be made through differentiated instruction, assessment methods, and used materials to make a learning environment that is flexible and addresses students needs. Depending on needs, skill, and other limitations, students may require parts of their project done for them or extra teacher assistance.

Project Instructions: see Coast Salish Drum Instructions

Plans: Students will create proper CAD plans of final project plans using CAD or drawn by hand. Examples of sketched design ideas need to be documented and put into project portfolio for assessment and proof of research and design exploration.

Assessment: Beyond the planned self/peer/teacher assessment during the final reflective talking circle, an organized community event could be arranged where students show their work to people outside the school and receive feedback from their community. The event may be even better served with a demonstration of the drums use (preferably with connection to the local Indigenous community). Further cross-curricular opportunities could be had by connecting with the music dept. (if available) and exploring Indigenous drumming and song in a practical way.

Next Steps: This project could very easily lead into exploring Indigenous design elements by having students create designs and paint said designs onto the face of their drum.

Historical & Cultural Context:

The Importance of Drum and Song

The drum and song are a very important part of Coast Salish Indigenous Peoples culture and lives. Different songs are performed for various occasions, including marriages, deaths, traditional games, spiritual and ceremonial events, and for fun! They are also sometimes used by healers for healing practice and were sometimes used during times of war. It is believed to be important to perform songs as it shows them respect

through being sung. Many Indigenous cultures believe that a song is alive as it is created through life giving breath. As they are alive, they must be treated with respect just like any other living thing.

Some songs are owned by families and handed down through generations, some spanning back hundreds of years. Some songs belong to ceremonies or masks that are owned by families. Only the family may decide who uses a song. It is also important that one family member be present when a song is preformed.

Most drums are created with a wood ring and with an animal hide tightly stretched over one side. Some nations teach that a person should give their first drum away as a sign of their generosity and good heart. Drums are often thought to be like a relative to a drum holder, so they must be treated well, stored carefully, and kept warm.

References:

BC Ministry of Education. (2016). BC's New Curriculum. Retrieved October 04, 2020, from https://curriculum.gov.bc.ca/curriculum/adst

Hanna, A., McIvor, O. & Dick, B. (2009). Earth songs curriculum guide: Educator's guide (pp. 1-11). University of Victoria: Victoria, BC. Retrieved [2021-02-22] from https://libguides.uvic.ca/lessonplans/IED_drum_songs

Ives, Phil (2012) How to Make a Traditional Coast Salish Drum: Jorge Lewis Drum Maker. 20:58 min. https://youtu.be/3uzmBCZUx0w

Coast Salish Drum

Name:_____

Date:_____Grade:_____Block:_____

Subject:_____

Dimensions of the Bentwood Box:

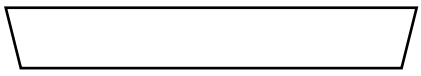
Part Name	Wood Type	Finish Size (Imperial / Metric)			Qty
		Thickness	Width	Length	
Sides	Red Cedar	5/8” 16 mm	2 ½” 64 mm	2” 51 mm	12

Build Instructions:

Cutting Out the Drum Shell

1. **Rough cut** one provided board of Red Cedar (1x6 board) to **14 inches / 356 mm** in **length**.
2. **Joint one face and one edge** of the piece so it is flat (mark jointed sides)
3. **Plane** the piece to **5/8” / 16mm** in thickness
4. Set the table saw angle to **15 degrees**
5. **Rip** (table saw) piece into **two 2 ½” / 64mm** wide strips
6. **Rotate** pieces **180 degrees** and run through the table saw again so your two strip have an end profile like shown below:

|------ 2 ½” / 64mm -----|



7. Once both boards have the V-shape, as shown above, set the table saw blade back to 90 degrees
8. Using **safe crosscutting practices** with a **stop block**, cut the two strips into **2” / 51mm lengths**
9. You should now have the 12 pieces you will need to make the drum shell.

Gluing Up the Drum Shell

10. Dry fit the 12 cut pieces and make sure they will make a **complete circle** when the 15-degree angle sides are all put together. If they don't make a circle with **tight corners**, talk to your instructor about adjusting them.

11. Once all corners and angles fit correctly, lay out two pieces of **masking tape** side by side with the **sticky side up** on a flat surface. Place the outside side each piece onto the sticky side of the tape. Line all pieces in a row. Make sure all corners are tight with no gaps.

12. Put a **moderate** amount of **glue** in all the "valleys" created by the angle sides being put together. **Roll the drum** with tape into the shape of a drum shell and make sure the tape is tight. **Let dry overnight**.

Trimming the Drum Shell

13. Using **a circle cutting jig** on the **band saw**, cut the drum shell into a perfect circle.

14. **Sand the edges** until flat. If edges are out by more than 1mm it may require instructor help.

15. **Sand the rough edges** of the sides to prevent damage to the hide that will be stretched over the drum shell

Apply the hide

16. Cut a **14" diameter circle** from the hide.

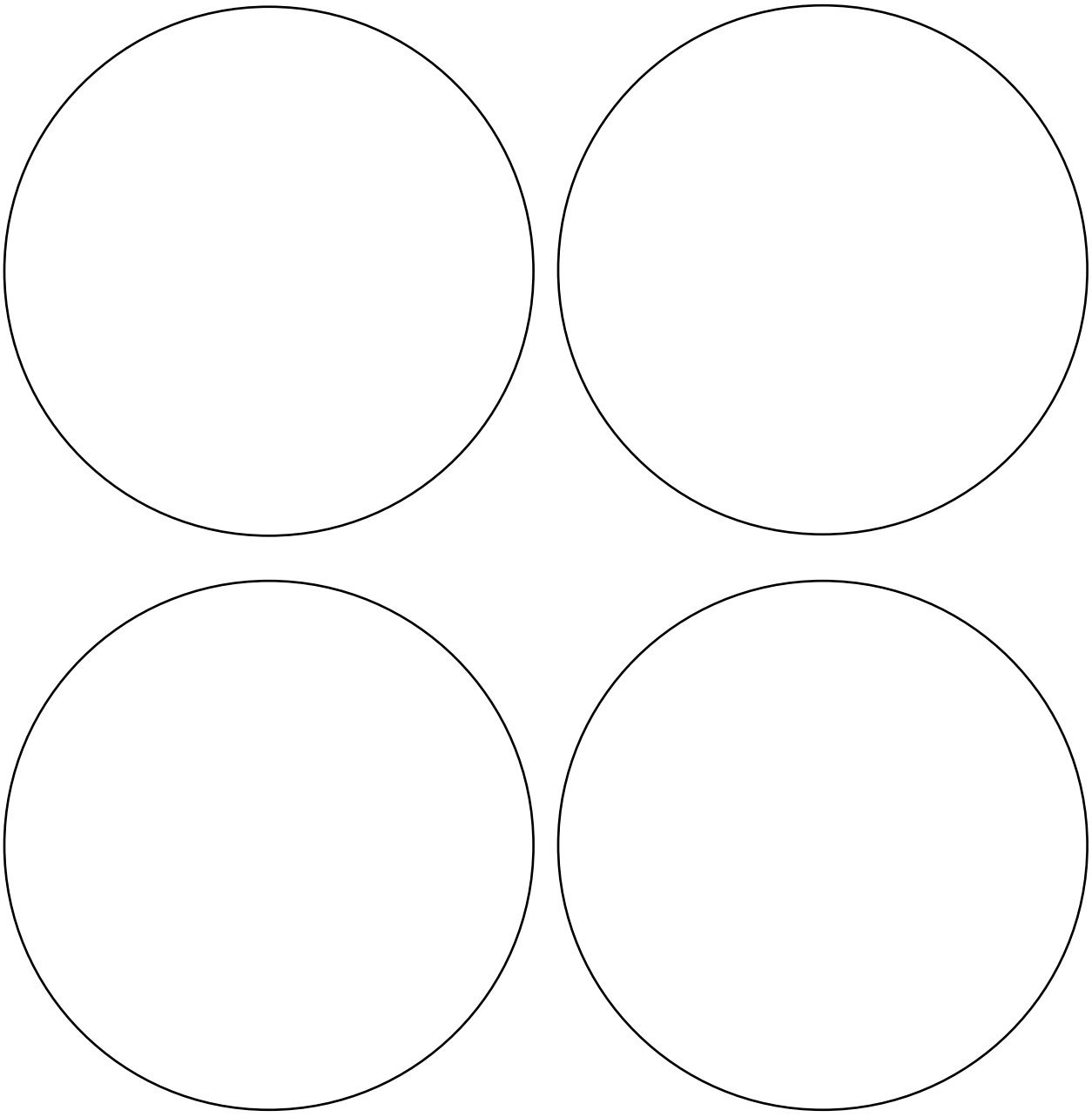
17. **32 holes (16 sets of 2 and evenly spaced)** need to be punched through the hide approx. **½" / 13mm** from the hides outer edge. The sets should be spaced a approx. **½" to ¾" / 13mm to 19mm apart**.

18. Using a singular hide strip/lace (**21 ft in length**) or a paracord rope, **lace the drum** in a **crisscross pattern** and lacing up a handle as show in the YouTube video by Jorge Lewis and Phil Ives, **How to make a traditional Coast Salish Drum: Jorge Lewis Drum Maker**.

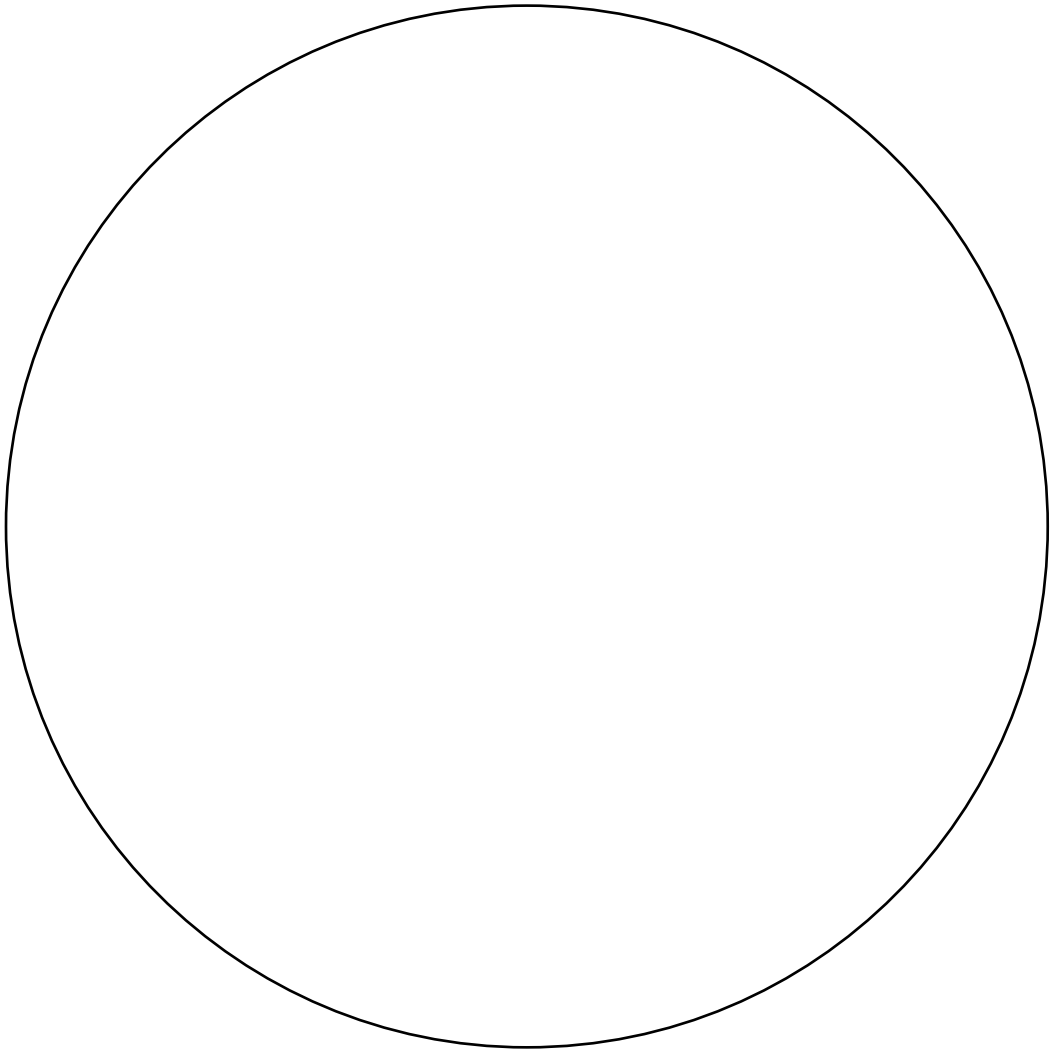
19. Let drum **dry** for **1 or 2 days**, avoid hitting it until completely dry.

Design Plan: Rough Design Sketches

Often, Indigenous drums are adorned with paintings often depicting animals of cultural important. Draw some ideas for your drum. Use a scrap piece of paper if you run out of room.



Design Plan: Final Designs



Design Plan: Written Paragraph

Using the space provided, write a paragraph explaining the reasoning behind your design. Why did you choose your design? Is your design meant to serve a specific purpose? ***Use full sentences.***

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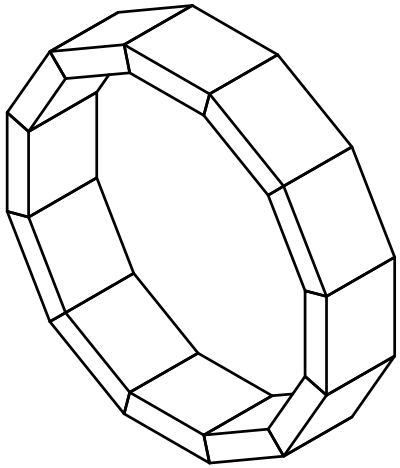

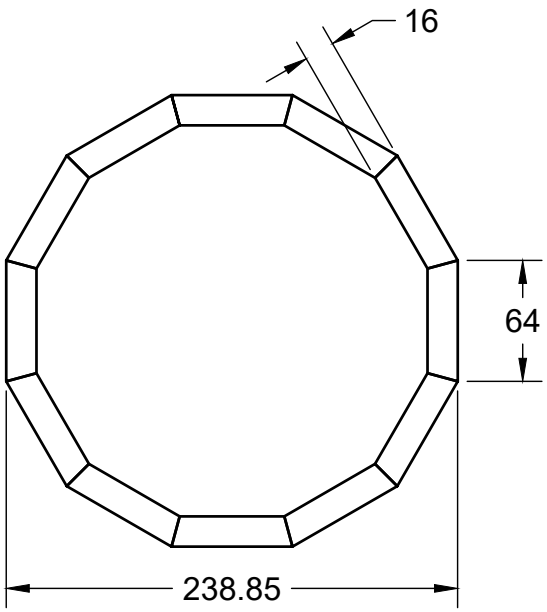

	PROJECT: Drum				
	TITLE: Drum Assembled				
APPROVED	SIZE	CODE	DWG NO		REV
CHECKED	A				
DRAWN Jeremy O'Shea 2021-02-14	SCALE 1:4	WEIGHT		SHEET 1/1	

Bentwood Box Unit Plan

Grade level: Secondary (Grades 9-10)

Project Timeline: 8-15 Hours

This unit plan is an example of what can be done to work Indigenous content and ways of learning, knowing, and being into the technology education shop/classroom. The goal is to not only create a project of importance to Indigenous peoples but to also put focus on the projects cultural and historical importance at a local level. Further, the unit is designed to explore the different types of bentwood box design and why they may be chosen over other box styles or build methods.

Some of the information may not be accurate outside of the local context for which this unit plan was created. It is important that educators connect with their local Indigenous communities or Indigenous education departments to ensure that their information and approach is accurate and that they are not overstepping any boundaries in the information they are sharing. The inclusion of Elders and Knowledge Keepers within the unit is also highly recommended to ensure authenticity and create connections between students and the visiting entity, opening an opportunity for cross-generational learning.

Project Delivery Strategy:

It is suggested that this project be approached using two methods of delivery. The first method requires access to computers with design and word processing capabilities to allow for students to perform research and work through the design process. The second method requires a more traditional woodworking space where much of the hands-on work can take place. Teachers can take whatever approach they are most comfortable using to deliver lessons and demonstrations.

This document will focus on maximizing shop time and utilizing computer/classroom time only as required/necessary. The classroom time should be used to support the work that will be performed in the wood shop, creating a deeper understanding and connection to the work and the students. More classroom time may be required during the initial planning stage and be needed less as the project progresses.

Unit Topic: Bentwood Box

BC Ministry Woodwork 10 Learning Outcomes	
Big Ideas	• User needs and interests drive the design process. • Social, ethical, and sustainability considerations impact design. • Complex tasks require different technologies and tools at different stages.
Applied Design	• **Understanding context** - Engage in a period of research and empathetic observation • **Defining** - Identify potential users and relevant contextual factors for a chosen design opportunity and identify criteria for success, intended impact, and any constraints • **Ideating** - Identify and use sources of inspiration and maintain an open mind about potentially viable ideas • **Prototyping** - Choose a form for prototyping and develop a plan that includes key stages and resources and evaluate a variety of materials for effective use and potential for reuse, recycling, and biodegradability • **Testing** - Conduct the test, collect, and compile data, evaluate data, and decide on changes • **Making** - Identify and use appropriate tools, technologies, materials, and processes and use materials in ways that minimize waste • **Sharing** - Decide on how and with whom to share product and processes and demonstrate product to users and critically evaluate its success
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Applied Technologies	• Evaluate impacts, including unintended negative consequences, of choices made about technology use • Evaluate the influences of land, natural resources, and culture on the development and use of tools and technologies
Content	• Project design opportunities • importance of woodwork in historical and current cultural contexts of First Nations, Métis, or Inuit communities, and other cultural contexts • ethics of cultural appropriation in design process • identification, characteristics, properties, and uses of wood from various species • choices related to the sustainable use of wood • uses and creation of plans and drawings • techniques for stock breakout and woodworking using a variety of tools and equipment, including stationary power equipment • function, uses, and role of portable and stationary power equipment in the creation of a project • function and use of hand tools

Lesson(s)	Objectives	Materials	Activities	Assessment
1. Research	• demonstrate proper cultural respect • understand the bentwood joining process in comparison to other joining methods	• Classroom • Pencils and erasers • Graph paper • Access to computers	• Watch: Kwakiutl, Kwakwaka'Wakw, wood carver displays his craftsmanship, Mungo Martin, 1963 (Youtube) Class brainstorm (in talking circle): • How to respectfully address another person's culture. Methods and Protocols. • Online research of different bentwood box designs • Compare and contrast bentwood box corners to other forms of joining (advantages & disadvantages)	• Teacher will observe students as they work together to question their understanding of Indigenous culture and technologies
2. Preparation	• create a plan to budget and build the bentwood box	• Classroom • Pencils and erasers • Graph paper • Access to computers	• Materials and Budgeting. Cost & where to get them. • Making plans. Box height, width, depth, and thickness.	• Student made plans and budgeting
3. Bentwood Box Sides	• Create the bentwood box sides using wood shop machines and tools in a safe manner	• Access to an equipped Wood shop with machines and tools needed for project. • Cedar 1"x6" boards for class	• Demonstrate steps and machines necessary to create the bentwood box sides • Use **Bentwood Box plans** to work through steps to create side	• Teacher will observe students as they work and question their understanding of the machines and the processes used
4. Steaming the Sides	• Stream bend the sides using steam process to create square box	• Machined and prepared side piece • Steam box or other steam source (kettle)	• Demonstrate steps and machines necessary to steam bend the bentwood box sides • Use **Bentwood Box plans** to work through steps necessary to steam bend sides	• Teacher will observe students as they work and question their understanding of the machines and the processes used

5. Bentwood Box Base and Lid	• Create the bentwood box bottom and lid using wood shop machines and tools in a safe manner	• Access to an equipped Wood shop with machines and tools needed for project. • Cedar 1”x6” and 2” & 6” boards for class	• Demonstrate steps and machines necessary to create the bentwood box lid and bottom • Use **Bentwood Box plans** to work through steps necessary to create bottom and lid	• Teacher will observe students as they work and question their understanding of the machines and the processes used
6. Reflective discussion	• Assess work through self/peer/teacher assessment	• Classroom • Student projects	In a talking circle discuss: • Design (changes or alterations?) • Analyzing woodworking techniques learned and used (for the project and historically) • Students showcase their work • Self/peer/teacher assess work	• Assessment discussion with class (self, peer, teacher).

Note: Ideally, an Elder or Knowledge Keeper’s participation in this project will add greater authenticity, connection, and cultural understanding for students. Indigenous bentwood boxes are not a homogenous thing. Getting a local context will provide local context for the project and give it more relevance.

Project Portfolio: Students should have at the end of the project – Bentwood box design sketches, CAD or hand drawn plans, completed bentwood box, performed a self and peer assessment.

Projects Parameters (Constraints, Expectations, and Showcase):

- Constraints: Materials (red and yellow cedar wood or other wood of choice, steaming method (steam box, kettle, etc.), glue, tape or elastic bands; budget (Materials can be costly and should be budgeted), and timeline
- Expectations: Students will produce proof of research, design sketches, plans, and a bentwood box. They are expected to participate in group discussions and honestly assess their own work as well as others.

- Showcase: Students will share their work with the class during a talking circle concluding the project. They will be expected to discuss their processes, design choices, and triumphs and struggles.

Adaptations & Modifications: Accommodations that can be made through differentiated instruction, assessment methods, and used materials to make a learning environment that is flexible and addresses students needs. Depending on needs, skill, and other limitations, students may require parts of their project done for them or extra teacher assistance.

Project Instructions: see Bentwood Box Instructions

Plans: Students will create proper CAD plans of final project plans using CAD or drawn by hand. Examples of sketched design ideas need to be documented and put into project portfolio for assessment and proof of research and design exploration.

Assessment: Beyond the planned self/peer/teacher assessment during the final reflective talking circle, an organized community event could be arranged where students show their work to people outside the school and receive feedback from their community. Further cross-curricular opportunities could be had by connecting with the foods department (if available) and exploring Indigenous cooking methods using bentwood boxes in a practical, hand-on way. An example of bentwood box cooking can be found here: https://www.youtube.com/watch?v=J53aK_9oHzs&ab_channel=PhilIves

Next Steps: This project could very easily lead into exploring Indigenous design elements by having students create designs and paint or carve said designs onto the four faces and/or lid of their bentwood box.

Historical & Cultural Context:

A Brief History of the Bentwood box

Bentwood boxes were made in many different sizes in the old days, with various types of wood being used depending on what they would have been used for, but typically red cedar was used as it is the most versatile. The boxes are made from a single plank which is steamed until pliable and then bent and the two ends are pegged together. The bentwood box is traditionally made and used by the Haida and Kwakwaka'Wakw peoples.

Musical Instruments

Very large bentwood boxes were used for boom boxes (drums) in dance performances and when not in use, these would store the dance regalia.

Clothing and Storage

Large boxes to store clothing in, and medium boxes used for many different purposes - some were even used for cooking in.

Cooking

To use a box for cooking, the cook would first put in all the main ingredients for seafood soup, add the water and any extra ingredients. While the ingredients were being prepared, someone else would be heating up rocks until they were glowing, and then they would be added to the water-tight bentwood box, and voila, you have instant hot soup or stew.

Food Storage and Transportation

Some of the smaller Bentwood boxes were made to carry water, dried salmon, halibut, fruit, and many of the other foods the Haida would need for their long journeys on their dugout canoes.

Burial Purposes

Some boxes were made for burial purposes. Chiefs and people of high esteem were placed in these bentwood burial boxes, and put up in a burial (mortuary) pole, when ready to pay respect to those who went on to the other side.

References:

BC Ministry of Education. (2016). BC's New Curriculum. Retrieved October 04, 2020, from https://curriculum.gov.bc.ca/curriculum/adst

Hilary Stewart's Cedar (1995) – a great accessible resource with good illustrations. https://douglas-mcintyre.com/products/9781550544060?_pos=1&_sid=e04bcf9e7&_ss=r

Indigenous Corporate Training Inc. (2012, July 31). A Brief History of the Haida Bentwood box. Retrieved February 1, 2021, from https://www.ictinc.ca/blog/a-brief-history-of-the-haida-bentwood-box

Ives, Phil (2013) PI'KWUN: Traditional Cowichan Salmon BBQ, Bentwood Box Cooking & Medicinal Plants. 25:47 min. https://www.youtube.com/watch?v=J53aK_9oHzs&ab_channel=PhilIves

Bentwood Box

Name:_____

Date:_____Grade:_____Block:_____

Subject:_____

Dimensions of the Bentwood Box:

Part Name	Wood Type	Finish Size (Imperial / Metric)			Qty
		Thickness	Width	Length	
Sides	Red Cedar	½" 12mm	4 ½" 114 mm	18" 457mm	1 per box
Bottom	Red Cedar	½" 12mm	5" 127mm	5" 127mm	1 per box
Top	Red Cedar	1 ¼" 32mm	5 ¼" 133mm	5 ¼" 133mm	1 per box

Build Instructions:

The Box Body

1. Cut your Red Cedar Board into three pieces each 20 inches / 508 mm.
2. Joint one face and one edge of three pieces so they are flat (mark them)
3. Plane the 3 pieces to 11mm in thickness
4. Lay one piece to the side. It will be the boxes bottom later.
5. Rip (table saw) 2 pieces to 4 ½" / 114mm
6. Crosscut (table saw) 45-degree angles on both ends of 2 boards to a length of 18" / 457mm
7. Sand the smaller face side (80 – 180 grit). This will save you sanding the inside of the box later which can be difficult.
8. Mark from one end of your boards the following points:
    a. 4 ½" / 114mm
    b. 9" / 229mm
    c. 13 ½" / 343mm
9. Re-measure the same distances from the opposite end. Your marks should be in the same spots already marked.
10. Use a square to properly mark your measurements

11. Using the router jig, cut V-shaped grooves across the grain using the lines you have drawn as a guide. Ask your instructor for help if you require it.
12. Once both boards have three V-grooves each, ready the steam box.
13. When the box is hot and steaming place your two boards in for 45 minutes.
14. Remove boards and slowly fold into a cube shape. If edges start to break put the piece back in the steam box for another 15 minutes and inform your instructor.
15. Use elastic bands to hold cube shape.
16. Place in vice in diamond shape and tighten vice until box is square (use a square).
17. Let box sit overnight

The Bottom

1. On the table saw, rip the 20" / 508mm piece you set aside earlier down to 5" / 127mm.
2. Using the crosscut sled on the table saw, crosscut piece on one end taking off minimal material. This is to create a true 90-degree end.
3. Measure and mark 5" / 127mm and crosscut on the table saw. Repeat. You should have two 5" x 5" / 127mm x 127mm pieces. These are your two bottom pieces.

Binding the Box Bodies Open Corner

1. Remove elastic bands. Your cube should hold its shape. If it does not, reattach the elastic bands.
2. With a pencil mark a parallel line to the open corner side at ¼" / 6mm from the corner (both sides).
3. Down one side mark a perpendicular line at:
    a. 1 ½" / 38mm
    b. 3" / 76mm
4. Down the other side mark perpendicular lines at:
    a. ¾" / 19mm
    b. 2 ¼" / 57mm
    c. 3 ¾" / 98mm
    d. Tape up the open corner insuring it is tightly closed and will not easily move.
5. Using an Awl, make an indent in the cross points you just marked
6. Obtain small dowels from your instructor
7. Using the drill press or hand drill, drill holes approximately 1" deep where marked. Use a drill bit appropriate to the dowel diameter.
8. Dry fit the dowel to make sure it fits correctly.
9. Using a hand saw, cut the dowels into lengths approximately 1 ½" / 38mm long
10. Glue up dowel pieces and push them as deep as they will go into the holes and let dry over night. Ensure corner is tight and will not move. Clamp if necessary.

Attaching the Bottom to the Body

1. Place the body on top of the bottom piece cut earlier and center the body to the bottom.
2. Once centered, using a pencil, trace the outside and inside of the box body to the bottom. This will help you mark where holes will be drilled.
3. When marked remove the box body.
4. Centered between the lines just drawn, mark 1-1/8" / 29mm from the edge of the bottom piece. You should have 2 marks for holes per side of the box for a total of 8 holes in total.
5. Confirm your layout using an awl to make a depression in the wood.
6. Place body on the bottom and line it back up to your pencil marks.
7. Carefully flip it over. Ensure it does not move on you.
8. Drill holes to the same diameter and depth previously used for the corners using the drill press or a hand drill.
9. Glue dowel and push tightly into holes.
10. Squeeze box in a vise and leave overnight to ensure a tight fit. You may need to place a small block of wood between the bottom (where the dowels stick out) and the vice.

The Lid

1. Crosscut wood for lid to a length of 12" / 305mm
2. Joint one face and one edge
3. Plane to a thickness of 1 ¼" / 32mm
4. Rip board to 5 ¼" / 133mm
5. Crosscut a finished end (creating a 90-degree corner) using the miter gauge/sled on the table saw.
6. Crosscut 5 ¼" x 5 ¼" (133mm x 133mm) squares using the miter gauge/sled on the table saw.
7. Measure the inside opening of your box. It should be around 3-11/16" / 94mm. If it is very different talk to your instructor.
8. Using the router table, cut out a 1mm deep groove on all four sides of the bottom side of the lid. You want the raised 1mm square to fit tightly into the box opening.
9. Set the table saw blade to 10 degrees and cut a bevel on all four sides of the lid with the top side remaining 5 ¼" / 133mm.
10. Test lid to fit and adjust if needed.

The Finish

1. Sand box (with the grain) from 80 – 180 grit
2. Consider a painted or carved design for the 4 sides.
3. Apply a clear stain or protective finish

Design Plan: Rough Design Sketches

Draw some ideas and try new things. Use a scrap piece of paper if you run out of room.

Design Plan: Final Designs

Design Plan: Written Paragraph

Using the space provided, write a paragraph explaining the reasoning behind your design. Why did you choose your design? Is your design meant to serve a specific purpose? ***Use full sentences.***

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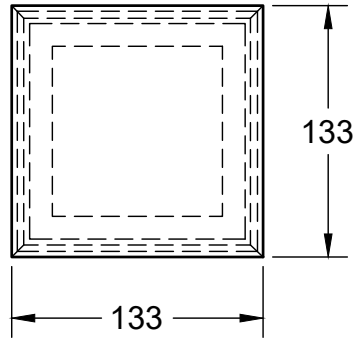
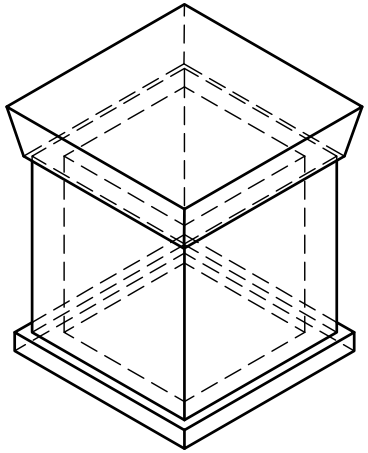
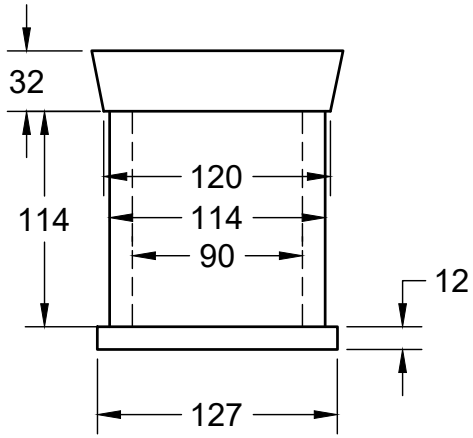
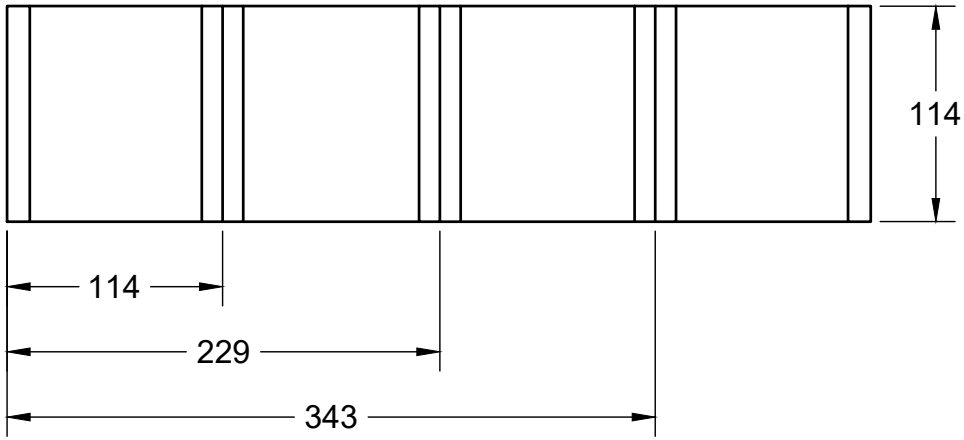
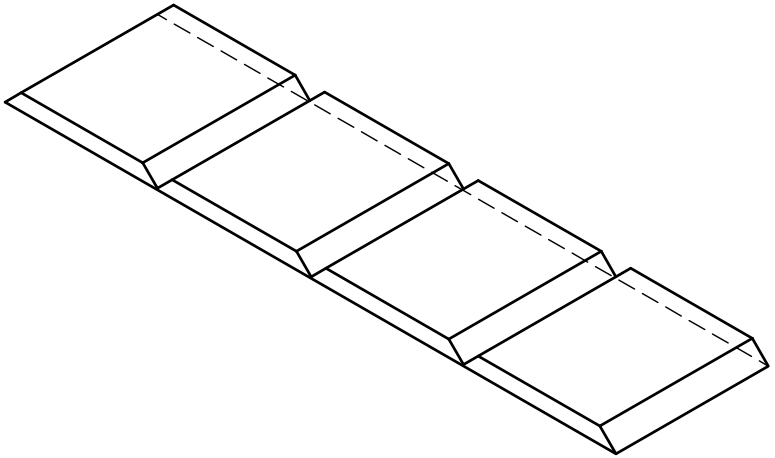


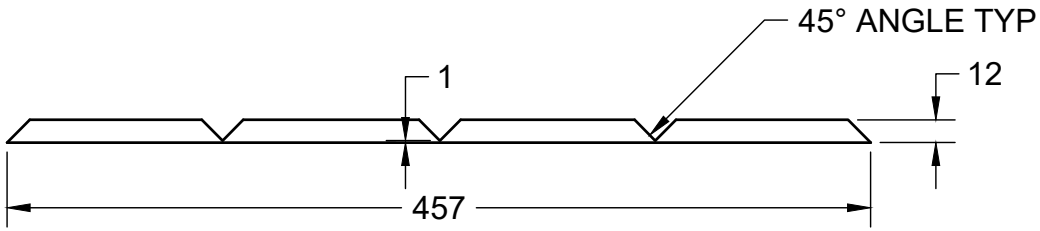


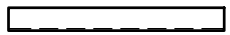


	PROJECT Drum				
	TITLE Bentwood Box				
APPROVED	SIZE	CODE	DWG NO		REV
CHECKED	A				
DRAWN Jeremy O'Shea 2021-02-27	SCALE 1:3	WEIGHT		SHEET 1/1	









PROJECT: Drum				
TITLE: Bentwood Box Sides				
APPROVED	SIZE	CODE	DWG NO	REV
CHECKED	A			
DRAWN Jeremy O'Shea 2021-02-27	SCALE 1:4	WEIGHT	SHEET 1/1	

Chapter Four: Summary and Reflection

Summary of Learning

At the start of this project I had very little understanding of Indigenous education and the many differing opinions on how it should be used in the BC classroom. I knew it was something I wanted to know more about and wanted to implement it into my work, but I had no idea of how to go about doing that. Much of the Indigenous education I had implemented in my classroom before this project was generally very broadly focused, albeit still important. Focusing on province and nation-wide topics/lessons, such as residential school awareness, moose hide campaigns, and Orange Shirt Day has been the norm in my classroom. Discovering the importance of a more locally focused approach to Indigenous education has been extremely eye opening and has created a new excitement for me in continuing my learning, making local connections, and improving my focus on Indigenous education in my shop/classroom. It is my hope that by creating this resource and sharing it in an open and online format that it will inspire other technology education teachers to expand their understanding of Indigenous education and include it in their work as well. It is also my hope that they will feel compelled to share their work with others, for the betterment of all and to lighten the load of other teachers and, more importantly, the generous Indigenous peoples who share their time, culture, knowledge, and ways of knowing, with us and our students.

Indigenous Education

The process of learning more about Indigenous education has been extremely enlightening and humbling. I have felt for a long time that Indigenous issues have been too often underserved and ignored and have tried to fight these injustices in my classroom. What steered me to this project was what I learned as a teacher about residential schools and other horrible events inflicted on Indigenous peoples throughout Canada's history, pre and post confederation. I had not learned much about these terrible events in my childhood schooling and, as I learned more, some of it came to a shock to me. This shock led to me re-examining my upbringing and the things I was taught. To my disappointment, I came to

understand that I had been raised within a racist mindset and it would be up to me to change my behaviours and thinking patterns to better myself and challenge others to also reflect on their learned racism.

After a time, I came to wonder why the Indigenous education we taught was always very broad and nation spanning. It was then that I realized it was because it was easy. It is a basic curriculum that can be shared across Canada and be taught anywhere. I knew there had to be more. The Indigenous people I know and have known in my life are not a singular homogenous group and I felt it unfair and a little ridiculous to present it that way. This is when I started to do more research.

I started by asking a large online group of technology education teachers what they did in their classrooms/shops to address Indigenous education. The responses were generally people looking for answers like I was. This made me realize that there is a big hole where Technology education and Indigenous Education intersect. There appeared to be enthusiasm for the topic, but few people knew what to do to integrate it into their teaching. I started by doing research into why Indigenous education is important. I found government statistics outlining the education systems shortfalls in addressing Indigenous issues. I dug deeper into residential schools and learned more about them in a British Columbian (BC) context and more locally to where I live (Victoria, BC on Coast Salish land). From there I began my search to better understand the case for Indigenous inclusion in the classroom, covering topics such as racism, decolonization, and reconciliation. I reached out to some Indigenous people in my life and asked their opinions and listened to what they had to say. Eventually, I began to research books and journals exploring Indigenous education, technology education, and where they meet.

Educational Technology

This project, as it is meant to be shared with others, has gone through a few iterations. Initially it was going to be a podcast but was inevitably changed due to the non-visual aspect of the medium. I felt technology education is best served with visuals and adjusted accordingly. Then a video series was considered but abandoned as it did not meet the goal of having viewers share their own work. Inevitably

the decision was made to make a website that allowed for the sharing of information, the potential inclusion of audio/video media, and also allow website visitors to share their own work with the website to potentially be added to the living document. A website was chosen over a social media-based group as social media websites have not proven to always last the test of time (i.e. Myspace, Google+, etc.). The website was created using Wordpress and utilizing the Radcliffe theme. Wordpress was chosen for its ease of use, large selection of options for themes, and low-cost considerations.

Implementing the Bentwood Box

Creating and implementing the two initial projects (posted in the "Projects" section of the website) in my shop proved to be very enlightening. I started with the bentwood box project and followed it later with the Coast Salish drum. The steaming process to bend the sides of the box was new to me and took many attempts and trying different techniques to get right. I eventually built a box big enough to house multiple sets of sides and made it mostly airtight. Steam was pumped into the box via a PVC pipe and a kettle that did not have an automatic boil shut off. I chose this approach because it allowed for multiple students to steam at the same time and worked consistently to produce mostly successful results when bending the edges. I chose to use predominantly modern tools and equipment due to time constraints but did take the time to explain the traditional methods used. Overall, the project itself went well. There are some design changes that could be made to the box, such as making the closing edges rabbeted instead of mitered. Either joining method would works and the preference has been left to the individual teacher to make based on their classroom/lesson needs.

Unfortunately, my initial plans to get in an Elder or Knowledge Keeper to talk to the class about the bentwood box project were unsuccessful. Due to the Covid-19 pandemic, understandably few people wanted to enter the school if they didn't have to. This led to me doing some heavy research into bentwood boxes and their historical and cultural significance in the area where I work. I did this with the goal of delivering context for the project with the help of my school's Aboriginal education department. It was then that I learned that bentwood boxes were not nearly as common in Coast Salish culture and was

generally more utilized by the Haida and Kwakwaka'wakw peoples, among others. Having done quite a bit of work at this point and feeling that the project was still relevant, if I gave proper context, I forged ahead. When presented with the project, students appeared genuinely interested in a woodworking technique that was traditionally only used in a local context. The enthusiasm I found at my first talking circle was encouraging.

I did two talking circles, one at the beginning of the project and one at the end. Having never done a talking circle I had much to learn. I quickly discovered some prompting of students or leading by example is required. After posing some questions to initial silence and hesitation, I managed to get the class talking by sharing some personal stories and my thoughts on the project and why I chose it. I found that once the talking started it became my job to steer the conversation in the right direction. I did find some fruitful conversation that was a little off topic but generally positive to the classroom community and environment. Because of this, I allowed it to continue and sometimes even encouraged it.

The second talking circle's buy in was much greater than the first now that expectations were understood. We started by debriefing about the project. Students shared what they learned and where problems occurred and how they would do things differently if they could. This loosened up the students to later self and peer assess their work as a group. The experience was generally positive with most students well engaged, something that has rarely happened for me in the past when self/peer assessing with students. This is a process I hope to continue with students in the future.

Implementing the Coast Salish Drum

The Coast Salish drum project turned out to be a ton of fun. The Aboriginal education department in my school was able to get a local Indigenous drum maker, Jeff Welch from the T'Souke Nation, to come and help us with the hides and share his knowledge and skills with us. The students were very engaged on the building days with nearly complete buy in. The drum shells were made before Jeff came to the shop using red cedar. This wood species was chosen due to its importance in Coast Salish culture, but I learned that its dust can be hard on the lungs and some people are allergic. A strong dust collection

system is highly suggested if using red cedar. In the end, every student walked away with a drum which the drum maker suggested they gift to an Elder or parent in their life to show their giving and unselfish spirit. Jeff connected with the students quickly and was able to explain the processes clearly and add context and stories to the work that I would have been unable to do on my own. I am thankful that Jeff was willing to share his knowledge with my class and I believe the students felt the same way. The experience was overall very positive and brought a strong local connection for many students who may not know much about their local Indigenous neighbours.

I hope to do this project again in the future. From what I learned, this project could very easily grow to explore Indigenous art and design to add a painting to the hide surface. Further, after giving the hides some time to dry, it would be very exciting to team up with the music program and explore Indigenous song and drumming. The cross-curricular possibilities of this project are both inspiring and exciting. I hope to expand the project a little more each time I do it.

Reflections on Growth

This project has led me to begin to understand the complicated politics behind many choices made in education and the push and pull of the many entities that are trying to press for greater Indigenous education implementation in the BC school system. It is a complicated issue that requires a large effort by teachers, Indigenous peoples, and other school/government entities. As one person, it feels like a large task to take on. But there is a large body of Indigenous people and allies who are working together to make the inclusion of Indigenous ways of learning, knowing, and being a reality in the BC school system. I am thankful that I can be one of those people and endeavour to continually work and grow toward greater inclusion in my classroom/shop, school, and community.

This project has been a launching point for me in expanding my understanding of Indigenous education. I hope to continue my learning by making local connections with the Indigenous people(s) of my community. This will be the best way for me to learn what I need to do better in my classroom and to create a real understanding for myself. Further, I hope to get involved more with my school's Aboriginal

education department and advocate more for the wonderful events they put on and the work that they do. I also intend to continue my own personal learning by studying books, research, and other authentic media to find better understanding of Indigenous ways of knowing, learning, and being.

The research I have done, and the creation of the website has opened my eyes to the work I need to do to better my classroom in addressing racism and better implementing indigenous education for my students and community. I need to make a stronger effort to reach out to the local Indigenous nations and communities whose children attend my school and learn more about them. I need to connect the projects we do and lessons we learn to the local community in a real way. I hope to invite Elders and Knowledge Keepers into my shop regularly to share their skills and knowledge and to have my students and myself get to know them and create meaningful relationships that last beyond the day end bell.

It is also important that I remember that learning goes beyond my classroom/shop. It is important to connect the work I do with my students to the resources and technologies they use in a real-life context. Connecting them to the land and community is in their best interest in guiding them to a stronger connection to themselves, the world they live in, and the peoples and animals they interact with. By addressing students holistically and breaking down the barriers between course subjects and the school and outside world, students will have a greater opportunity to explore knowledge and lessons without them being segregated or siloed. Students should also be given the opportunity to share their learning with themselves, peers, parents/family, Elders, and greater community. By sharing their work with others, they can gain greater feedback, including multiple points of view they may not have considered before.

With the website, I hope to share what I have learned with other technology education teachers. My hope is that they too will see the need to put in the effort to create a more Indigenous focused shop and share that work with other teachers as well. As there are many differing opinions about Indigenous education, I endeavour to inspire other technology education teachers to seriously question their commitment to Indigenous education. For some this may mean starting from little to no knowledge, as I have. For others this may mean pushing themselves further to help in advocating and implementing

Indigenous education in their schools/classrooms/shops for the betterment of their students, communities, the environment, and themselves.

Making A Website

Creating a website is not something I have done before to any serious extent. The learning curve has been steep, but the final product has been worth the work. Learning new online design concepts, such as what makes a website look great and easy to navigate, has been a rewarding experience. It is easy to take for granted the work of others and not analyse the effort put into websites and how they work. Through the creation of my own website, I have discovered what thought and design considerations are required to help the website user find the information they are looking for. Further, it forced me to explore using other people's work to back up and supplement the resources I had created, such as pictures and links to other web-based resources in an ethical manner.

A large part to making the website look good was finding pictures of high quality which were free and made sense to the context of the content. I focused mainly on pictures of nature as I felt they would be best suited to attract the eye with their colour and also express the relationship we all have to the land, an important aspect of technology and the resources we use. All pictures were found on the image search option on the Creative Commons web page. The pictures chosen are open to be used by others if they are properly cited with credit given to the author (Creative Commons, 2020).

Recommendations for Future Research and Practice

The research on Indigenous education is becoming more encompassing and thorough. Unfortunately, the implementation of Indigenous education with technology education is drastically under researched. There are few academics focused on the matter and the research often is set in a non-North American context, such as Gumbo (2015; 2017). While the experiences, goals, and outcomes this research presents are credible and useful, they do sometimes come with cultural differences that don't always apply to the local context. More research focused on technology education and Indigenous education in a

North American context would greatly aid in the continued pursuit of their symbiosis and mutual growth. Having struggled to find some of the research I was looking for I had to adjust to adjacent research, on topics such as sustainability and Indigenous education's application in other subjects, such as science, art, STEM, and social studies.

Beyond academic research, this project should be recognized as being in its infancy. It is my hope that that it will continue as a living document to grow as I and others contribute more to it over time. Because Indigenous education is not a single homogenous entity, it will likely take a lot of time, effort, and work to create authentic resources for communities around British Columbia, a task I will not be able to do on my own.

In practice, the First Peoples Principles of Learning and the other teaching strategies and projects presented on the website are just a beginning. They are a broad guideline with the goal to get a teacher pointed in the right direction. Ultimately, it is up to the teacher to learn how Indigenous education should be implemented in their community. This involves meeting with school and/or district Indigenous education departments and collaborating on methods and lessons to implement in the shop. It includes connecting with the local Indigenous communities, inviting Elders and Knowledge Keepers into the classroom, and connecting the classroom to the greater community. This project hopes to narrow down Indigenous education from a national context to a more localized one, but it inevitably will likely come down to the teacher putting in the work to make it happen.

Conclusion

When starting the master's program in educational technology, I wasn't entirely sure what I was getting into. I assumed I would learn about new and upcoming technologies that could be used in and out of the classroom, but I didn't expect how much more there would be. Becoming a technology education teacher is unique in BC as you don't need to go through a bachelor's program like required by many other subjects. Because of this I felt a little bit out of my depth at the beginning of the program, having never really had to do any serious research or having to deeply dissect academic papers. Some concepts that

others appeared comfortable with were completely foreign to me. Fortunately, the program was well designed to help all learners develop in their own way and work together with others to meet the outcomes of the program's courses.

One of the greatest lessons I learned from the program was how to create a healthy online community. Discovering that the creation of an educationally focused online group was possible and could be done with complete strangers during a stressful time, such as during the Covid-19 worldwide pandemic, was very enlightening. It is my hope that I can take what I have learned and apply it to my project's website, to foster its own community to aid in its growth, quality, and authenticity. Using the online communication tools that I have learned about I believe there is a greater chance to meet this goal and to make it a reality.

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