Sustaining Technology Integration Supporting 21st Century Learning through the Context of School Culture

by

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Abstract

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This paper serves to examine technology integration through the context of school culture. By exploring my personal experiences with professional development I begin to unpack the complexity of change models in schools in relation to technology integration. The literature highlights three concepts that I believe is essential in understanding how to effectively integrate technology into educational systems; technology and its applications in education, professional development models and to what degree the effect of school culture influences technology changes. The project plan outlines a four stage process of initiating technology change through school culture that promotes collegiality and sustainability for promising results based on the research and personal professional observations and experiences.

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Chapter 1: Introduction

Becoming the Best Versions of Ourselves

Professional development is a part of a teacher's life, of any career. It is what makes us better at what we do by keeping up to date with the most current of practices, tools and strategies for our ever changing societal landscape. Every professional occupation requires the improvement of skills and abilities within said occupation. For educators, this means developing skills, knowledge and expertise that characterize a teacher including pedagogical practices, identifying and adjusting to students' diverse needs and assessment strategies (Lemke, 2010). The exponential advancements of technology have resulted in a massive movement in the educational profession expecting teachers to include the newest technologies to engage students and enhance learning. Conducting an internet search of educational technologies, one can find a multitude of websites and Twitter feeds dedicated to the sharing of best practices of such educational technologies. While several teachers embrace what they learn, others take it in stride. Atomic Learning published an infographic (Figure 1), adapted from Rogers (2010) innovation adoption curve, in relation to teacher's adoption of technology through professional development that strongly indicates the majority of teachers fall within a particular range requiring "small, face-to-face workshops that allow [teachers] to gain confidence and build upon each other's excitement" (Atomic Learning, 2014).

With so many rapid advancements in technology, how do we deliver sound professional development that keeps our educators abreast with the newest of practices when there are those, according to the innovation adoption curve (Rogers, 2010), not as quick on the uptake? Research

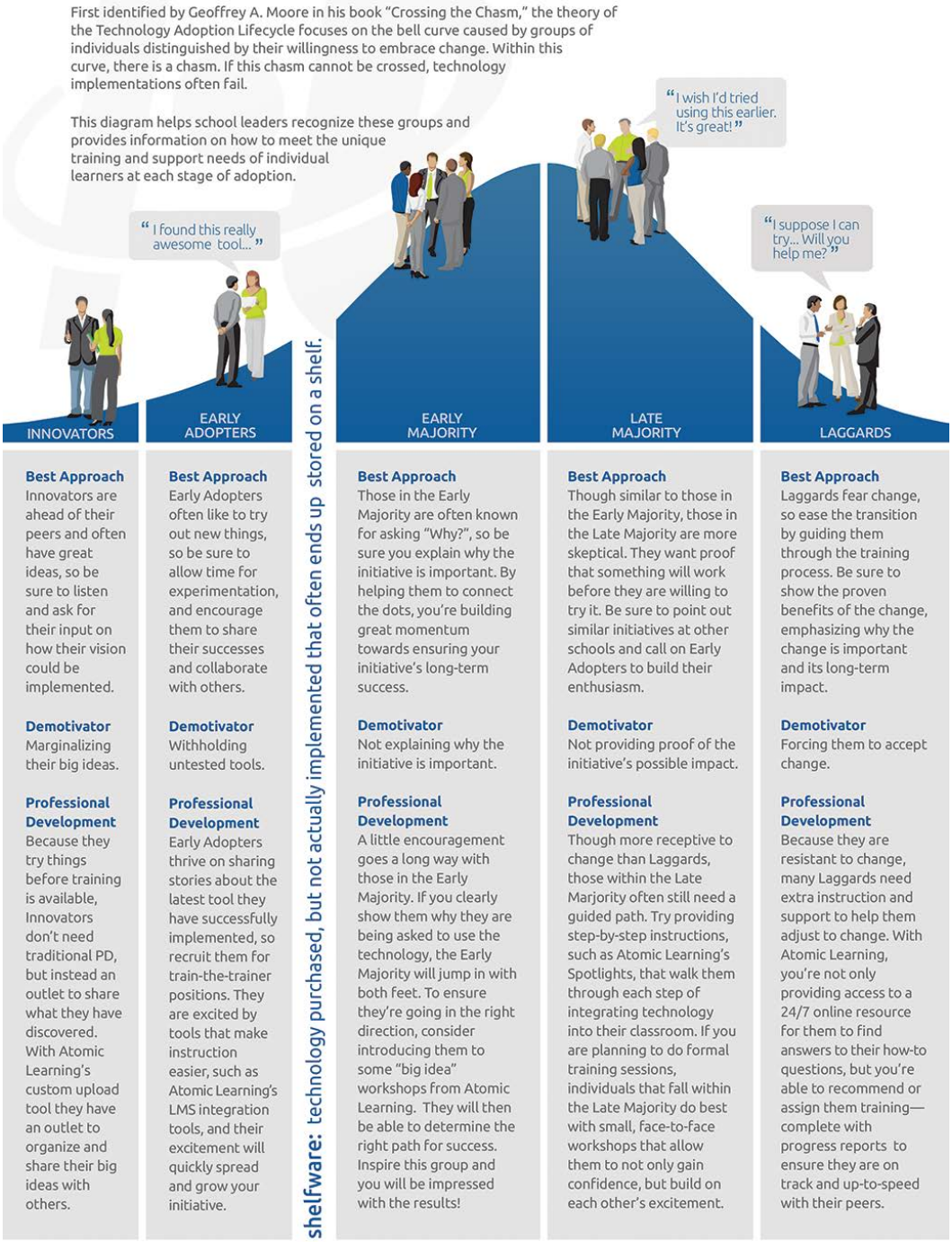

Figure 1. Understanding the Technology Adoption Curve in Education. The graph depicts stages of technology integration with reasoning and suggested approaches to professional development.

has shown that static professional development over short periods, as I like to refer to as 'sit and get' are not sustainable methods to develop ones' professional practices. Effective teaching

practices having a positive and significant effect on student learning takes time to foster and integrate when combined with working relationships (Lemke, 2010; Timperley, 2010; Yoon et al., 2007). Reflecting on my own experiences with professional development, I draw from the most valuable sessions integrating that with which research states about effective teacher education and formulate my own philosophy on what constitutes successful professional development.

First Experiences

Coming from secondary schools, professional development for teachers was not something commonly spoken about in the staffroom, positively anyway… we were, after all, experts in our field. High school mentality was a tough one to crack. It was challenging enough to get into a high school right after graduating let alone teaching diploma level courses, therefore a sense of pride and distinction immediately surfaced on those that taught at the high school level, for the most part. However, as a first year teacher, there was the expectation to attend a district run program for those who were new to the field called *Inspired Beginnings*. The first meeting was quite awkward. A room full of young, bright teachers professionally dressed with fear and anxiety draped as accessories. Several of us had been teaching for a few months now so one would think that these feelings would be present, and yet they were predominant. The initial meeting went well as we shared the basic information you would when meeting with a group of teachers for the first time…. What school we were at, what our teaching assignment was, even sharing exemplars of our best practices. These particular meetings occurred throughout the school year, gathering together every couple of months to discuss our teaching journey, what we had discovered about the profession of teaching and any concerns that we had. Many had shared some valuable techniques during these sessions which I still use to this day. Sensible strategies

work whether you teach 8 or 15 year olds. By our third meeting, we were all fairly comfortable with each other and that was the moment when we really opened up. So much so that the tears began to flow as we all expressed how we struggled and how challenging it was to be a first year teacher learning the ropes. It was fascinating to find out how many in our group were tasked to coach team sports, run extra-curricular activities and organize assemblies in addition to developing well balanced lessons.

As the year progressed, those group members and leaders became a network of supports that helped each of us get through the challenges and struggles by providing their own stories as moments of reflection or cherished techniques that saved us time and stresses. With every session, the feeling of loneliness in a chaotic occupation seemed to lighten with each story, tear and word of understanding. There was much to be learnt within this *Inspired Beginnings* community and regardless of the topic of interest for this group, the social network that formed was crucial for positive personal and professional improvement. The community enabled educators, whom already are overloaded with daily routine, the opportunities to synthesize new knowledge and practices that have been shared with and developed by themselves allowing for ownership of best practices (Timperley, 2010).

Sit and Get

I have never been a fan of ‘sit and get’ style of professional development which often involves a presenter, who is sometimes external to the school community or district, in the hopes of enlightening the audience through the use of vivid presentations and unidirectional conversations. Reflecting on these types of sessions, I can hardly recall the topic, intention or individual leading the session. I do remember the lack of uptake of new strategies or information that had been fed to us with the expectation to take it back to the classroom and use throughout

the school year which never happened or held on for long. Often the tool or strategy had been forgotten and regular routine ensued. No time was dedicated to promote longevity of the intended strategy (Krell & Fitchman Dana, 2012). If a traditional 'sit and get' style professional development session had been designed in a way to included hands on processing through a series of continuous sessions building upon a particular strategy this would have been the opportunity for some tool or technique to resonate and take hold. In my first year at a Junior High I was assigned to teach Math Nine, a realm that I was definitely no expert in. I enjoyed Math as a student; teaching it, however, was an entirely different story. The Math consultant at the time held one working sessions to explore practical exemplars and strategies for immediate use in the classroom. With each of the tools we were introduced to, we were given the opportunity to act as the students, work in grade level groups and use the tool or strategy with the curriculum that we were in the process of teaching, thus providing us with a new approach to a familiar concept. Unfortunately these sessions did not reoccur throughout the year losing the momentum of the strategies in the classroom.

Finally a Program that Worked

One of the most valuable experiences with professional development came with the adoption of Smart Technologies in the district. Hundreds of boards and response systems had been appearing in schools, so in an effort to increase the utilization of this emerging technology, the *SmartTech Mentorship* program was established. This program was offered to a select group of individuals who were quick in adopting Smartboard systems from all over the district. According to the adoption curve that Rogers (2010) outlined, these group of select individuals were part of the innovators and early adopters to innovation. To be able to be an active participant in the group, one had to apply to be accepted which immediately established

commitment to this group if one was accepted into the program. Each session was held around a specific topic or strategy to use on the Smartboard and Smart Notebook software, with the session being run by a Smart Technologies trainer that was brought in. The trainer would lead us through a tutorial overview of the tool or strategy, then with her resources as a baseline we would create our own exemplar followed by a gallery share at the end. Part of the expectation of the group was also to take what we had created in the sessions, field test the resources back at our sites then return the following meeting with feedback for the trainer and group members. Quickly we were able to discover the nuances of the tools, effective strategies, pros and cons, as well as untapped ideas that others had brought back with them. No longer was I the recipient of information and strategies. I had now taken the place of creator of which I collaboratively developed with those of the group, the contributions that were made to the resources increased their validity within the schools as they were developed by teachers for teachers (Krell & Fitchman Dana, 2012).

As in my first experience with small group, face-to-face professional development through the Inspired Beginnings cohort, there was an appreciation of each other's strengths and experiences that developed over the year. This resulted in collaboration that lead to refined resources and a collection of shared lessons as a result of joint effort. The trust and ideas shared that fostered with each session moved the group from a typical 'sit and get' style approach to a format where the participants were able to see growth in their own and other's abilities in integrating Smart Technologies in the classroom. This community of *learners* became a community of *leaders*. The knowledge and strategies we developed spread through the district over the next couple of years which resulted in a vast increase in effective uses of Smart Technologies.

From Practice to Practical

Throughout my career I have been exposed to various formats of professional development and through those experiences, the information and skills that I have acquired and the means by which I had built upon them largely influence my delivery methods to district staff. Hearing frustrations uttered by teachers in terms of their own experiences with professional development and training with technology is often directly related to the methods in which they are delivered. Teachers have commented many times throughout conversations that having the hands on experiences as well as tangible uses for the tool being learned are essential for the strategies to take root in the classrooms. Reflecting on this through my own journey I am able to identify why particular technologies had become so engrained in my teaching practices, not only through my own interests and passions, but through the strengthening of my skills in the communities I had been given the opportunity to be a part of. The combination of developing strategies within a community of learners over a period of time allowing sufficient time to learn tools, apply them pedagogically and apply them practically has proven an effective means of improving teaching practices and integration of technology (Krell & Fitchman Dana, 2012; Lemke, 2010). I draw from my own experiences with the *Inspired Beginnings* and *Smart Tech Mentor* programs in that organizing a community of learners either within a school or through out-of-school sessions will provide educators the opportunities to build a network of experts to tap into for inspiration and support (Krell & Fitchman Dana, 2012; Timperley, 2010).

Fundamentals for Successful Teacher Professional Development

Teacher collaboration is essential for establishing a healthy atmosphere of personal growth and improvement. So often are teachers isolated in their own classrooms, closed off from witnessing the innovative practices and progress that others are making, often not aware of what

exists beyond their classroom walls. Establishing a community of learners not only provides the venue for teacher collaboration, relationships form as a direct result. These peers move on to become a support group for each other during challenges and encouragement during the journey since all those who are part of the community of learners are there for similar reasons. Together educators work towards a unified goal: improving student engagement through technology integration (Krell & Fitchman Dana, 2012). Teacher professional development in isolation can become a struggle when there are little to no supports for when methods go wry and teachers tend to revert back to a tried and true method when there is no one to turn to for solutions or advice (Timperley, 2010). Through communities of learners, teachers have a network of supports encouraging a willingness to improve. Being able to identify with a group of individuals having similar aspirations and goals enables teachers to find the motivation to continue learning. Creating this type of community, however, does not occur over one or two sessions, rather in a long term series so that participants have the chance to take back, test and return with results to share with others who would be familiar with the methods they are attempting (Lemke, 2010). The process seen in these communities of learning are similar to the structure of Action Research or Participatory Action Research; a cyclical process of professional development requiring participants to plan, record, evaluate and repeat to determine if there has been improvement in student engagement with their practices (Krell & Fitchman Dana, 2012).

As the educational landscape goes through changes to accommodate the societal and technological demands of our generation, so too must the processes by which we support and guide educators. Many educators, including myself, are born from a pre-inquiry time where repetition, memorization and standardized testing were the norm (Noddings, 2007). Shifting educational pedagogy to develop 21st century skills and attitudes (Alberta Education, 2010)

requires restructuring a system that has held true for hundreds of years. If 21st century competencies boast qualities such as collaboration, effective communication, and flexibility (Alberta Education, 2010; Noddings, 2007) then teacher professional development should reflect the changing structure of education. Through communities of learners, educators can design their own learning, collaborate and share best practices with likeminded others, revise strategies via peer communication and critical reflection and thereby strengthen classroom pedagogy together for the betterment of student learning.

Chapter 2: Literature Review

The Exponential Technology Evolution and its Impact on Education

Our workforce is shifting from individuals who work in factories or isolated cubicles to individuals who connect with team members to solve problems and develop innovative solutions. Desired employees are those who are able to collaborate efficiently, be flexible, exhibit ingenuity, strong people skills and demonstrate high self-awareness (Alberta Education, 2010; Lemke, 2010; Noddings, 2007). If we hope to establish these characteristics in adults, we need to begin developing these competencies in students. Alberta Education (2014) has acknowledged the need for these desired traits in their future citizens, and as such has developed a framework of education around what is known as the 3E's, which states that:

> The fundamental goal of education in Alberta is to inspire all students to achieve success and fulfillment, and reach their full potential by developing the competencies of Engaged Thinkers and Ethical Citizens with an Entrepreneurial Spirit, who contribute to a strong and prosperous economy and society. (p. 3)

Alberta Education has recognized the changing face of society which includes the work force and social realities of its citizens and as a result has had an impact on the expectations of students. A document entitled *Inspiring Education* published by Alberta Education (2010) creates a framework for education focusing on developing 21st century skills of our students to match the demands of the changing world, included in these skills are: knowing how to learn, thinking critically, innovate, applying multiple literacies, demonstrating strong communication skills both locally and globally and demonstrating global and cultural understanding (Figure 2). As a result, Alberta Education has taken the stance in setting a new curriculum that addresses both the expansion of content outcomes, the 21st century competencies along with modifications to the range of subject based learner outcomes. Through the Alberta Education ministerial order (2013b), the implementation of the cross-curricular competencies through the umbrella of engaged learners as ethical citizens with entrepreneurial spirits (3E's), the goal is to weave these competencies within subject material (Alberta Education, 2014; Parsons & Beauchamp, 2012). Noddings (2007) also addresses the shift from factory based skills to those that involve "means-ends planning, diagnosis of problems, and cooperation in the search for solutions" as the workforce moves from "mindless, repetitive work" to collaboration and innovation within teams (p. 77). In light of the new skills and attitudes preferred in students, implementing technology that will "support the creation and sharing of knowledge" (Alberta Education, 2014, p. 3) will provide students the best possible opportunities to cultivate the desired qualities.

Edmonton Catholic Schools has responded to the call set forth by Alberta Education and has put together a professional development model for educators that shifts pedagogy and practice to address the changes we are facing. This model, Transform, guides educators through long-range, action research situated professional learning centered on ten pedagogical shifts that

move from teacher lead instruction to student-centered learning in the theory that shifting pedagogy to encompass these beliefs will produce students that fit the expectation of 21st century learners through the cross-curricular competencies as identified by Alberta Education. The ten pedagogical shifts are the means by which Edmonton Catholic Schools will prepare students for the future. These shifts include 1) competency based 2) cross-curricular themes 3) student as inquirer and creator 4) higher-level thinking 5) project-based learning 6) formative assessment 7) collaborative learning 8) multi-grades 9) multimodal (print, visual, digital) 10) differentiated and personalized learning (Transform, 2012). As a district to move forward and see these shifts through, technology has been recognized as the outlet to achieving results in these areas. Through the tools available in the district, schools are able to promote collaborative learning through cloud based solutions, student as inquirer and creator through mobile devices that foster real-time, authentic learning; personalization and differentiation by providing students more than one option to access, process and construct their knowledge through video exploration and production, blogging, online forums, video conferencing and more (Johnson et al., 2014). Moving towards these pedagogical practices requires large scale teacher preparation and collaboration through which technology can be leveraged to communicate, collaborate and create environments supporting student centered learning (Transform, 2012).

Figure 2: Cross-Curricular Competencies. Diagram of an Educated Albertan as described by the ministerial order (#001/2013) developed by the Alberta Regional Consortia.

The Rise of the Machines. Considering the evolution and affordability of technology, such as personally owned devices in the marketplace, as reported in the K-12 Horizon Report (Johnson et al., 2014), combined with the boom of social media as a tool for learning and collaboration, it would be difficult for educational institutions to ignore solutions for students and staff that leverage these devices. Technology is entering into our schools at alarming rates, trends such as cloud computing and mobile devices listed as a trend that would require two to three years for implementation according to past Horizon Reports (2009) have migrated to the top of the list as fast moving trends (Johnson et al., 2009; Johnson et al., 2014) taking less than a year for school and classrooms to adopt. These rates of increase pose questions for educational stakeholders in terms of where their school environments stand when trends that are currently listed as long-rage (three to five years) climb the ladder and see themselves entering our classrooms in less than a year. Will teachers be able to find places for self-quantifying devices, virtual assistants and wearables (Johnson et al., 2014; Skiba, 2014) within the next couple of years? The advancements seen in technology and what they enable humans to accomplish has the potential to change the way we operate in education. “These [technologies] have the potential to turn upside down many of the models and beliefs about learning that traditionally underpin educational practice” (Haste, 2009, p. 208). There needs to be consideration into how these technology trends will affect our educational system and how do we best prepare our teachers to be able to handle the technology market that is driving our society and inevitably our schools (Johnson et al., 2014; Noddings, 2007; Parsons & Beauchamp, 2012).

Accomplishing the Impossible. The range of curriculum has expanded as discovery, development and innovation in our world is increasing. The pressure for our teachers to have thorough knowledge and understanding of all this content is daunting and simply covering the content can take time away that should be dedicated to facilitating and guiding students in their learning. In addition to curriculum growth, we are also witnessing the growth of technology in schools by both the organization as well as what students are bringing in. In keeping with the drastic movement of technology, educational organizations need to prepare students for the changing landscape of society and the workforce with the skills and competencies required in the new era of innovation (Alberta Education, 2010; Johnson et al., 2014; Noddings, 2007; Tan, 2012). “There is an increasing need for these competencies in today’s information society, but students of different educational levels have been found to lack them” (Chu & Chow, 2011, p. 140). The burgeoning economic landscape dictates that students be equipped with specific skills that are particularly relevant for the globalized economy. These skills include information literacy and communication skills, critical and creative thinking skills, civic literacy, global awareness and cross-cultural skills (Tan, 2012), resourcefulness, adaptability and innovation (Noddings, 2007), financial, economic, business, and entrepreneurial literacy, leadership and ethics (Crockett, Jukes & Churches, 2011) all of which are echoed in Alberta Education’s mission to foster these capacities. The government has responded to these societal changes by stating that “our education system must simultaneously prepare the citizens of tomorrow while equipping our students with the knowledge and skills they need to be successful in a rapidly changing economy and society” (Alberta Education, 2014, p. 1). By focusing on these initiatives and restructuring education that is designed to foster these desired traits for the modern student, there is a greater chance of weaving together cross-curricular competencies so that the content

becomes adaptable, relevant and engaging for students in preparation to be proficient, contributing members of society (Parsons & Beauchamp, 2012).

Technology Aids in Developing the Skills Necessary for the Modern World. Literacy and numeracy have been established as the foundations of education and the keys to success for our students (Alberta Education, 2014), however, as society evolves, so too do the means that provide students the opportunities to become fluent in these areas. It is through these outlets that these traits can extend beyond the borders of the school walls in ways that were not possible 20 years ago.

> "Human beings are tool users. We interact with our world through *tools*, which include everything from screwdrivers to metaphors. The nature of the tool, and what it facilitates, shapes how we interpret the world. Our interpretations of the world derive from our actions upon it. The tool mediates our understanding" (Haste, 2009, p. 212).

As such, the tools we use on a daily basis outside of the realm of education are sparse within it, denying students the opportunity to interpret and understand the world through the very tools they use in it. Until technology is fully embraced as a necessary tool in education, learning is more authentic outside of the school. Repetition of key concepts can be replaced by game based programs that strengthen these same curricular outcomes through challenging scenarios fostering problem-solving and adaptation that result in higher performance standards (Chu & Chow, 2011). By choosing the appropriate technology, teachers have opportunities to alter curriculum in different ways to improve the quality of classroom activities and scope of how the fundamentals are applied through a wide range of authentic contexts (Gülbahar, 2007). The factor technology will play is the extent to which students are engaged, able to communicate their comprehension and ability to express their thoughts and ideas (Kim et al., 2013; udlcenter.org, 2014). "The

effectiveness of technological pedagogy around specific subject matter requires developing sensitivity to the dynamic, transactional relationship between these components of knowledge situated in unique contexts" (Koehler, 2012, paragraph 3). This notion requires educators to explore the possibilities technology usage in teaching–learning processes can provide to transform learning to broaden the learners experience and foster "increased student writing, enhanced cooperative learning, enhanced integration of curriculum, greater application of learning style strategies, increased applications of cross-age tutoring, increased teacher communication, enhanced community relations and enhanced global learners" (Whitehead, Jensen, & Boschee, 2003, pp. 10–12 as cited in Gülbahar, 2007, p. 944).

Students will not experience failures in the future if they are unable to effortlessly navigate an iPad nor are they judged on their ability to upload content to a cloud-based server. Integrating technology gives students an outlet to be able to practice and develop the skills necessary to participate as an active member in our globalized society (Noddings, 2007). "If our students are to survive, let alone thrive, in the 21st century culture of technology-driven automation, abundance, and access to global labor markets, then independent thinking and its corollary creative thinking, hold the highest currency" (Crockett, Jukes & Churches, 2011, p. 2). Students are inheriting a future that expects them to become problem solvers, individuals that manage themselves and members of society that can tackle problems in creative and innovative ways. With the diversity of 21st century skills and competencies that are now becoming more predominant in the educational landscape (Alberta Education, 2010) to better prepare students for the future, including global communication and collaboration, critical thinking and strategic problem solving is not due to technology, these factors are a part of human nature. Technology has succeeded in providing solutions to those once excluded and creating more opportunities to

become successful (Tan, 2012). Technology integration embedded within curriculum assists in minimizing the expectation to deliver information and optimizes time for personalizing learning by engaging students authentically (Skiba, 2014). Through the use of technology "knowledge is distributed, rather than contained within one mind. The individual becomes the agent, not merely the *recipient* or *participant*" (Haste, 2009, p. 209). Multiple educational formats centering on student developing competencies such as inquiry based learning and project-based learning leverage technologies that empower students to take ownership of their own learning through self-discovery and problem solving, all the while developing informational and IT fluency (Chu & Chow, 2011). In doing so supporting a variety of competencies identified by Alberta Education (2010) such as thinking critically, innovation and identifying and applying career and life skills.

Driving Forces behind Technology Integration. The demand for technology in the classroom is not only driven by parent communities, district and school administration, students themselves are driving the change. As digital natives, students find themselves disconnected from education, a distinct contrast to technology to which they are constantly connected. In an analysis of technology integration in schools, Gülbahar (2007) discovered that students outweighed teachers and administration in their expectations of technology usage in the classroom. The percentage of students who stated that they wanted to take lessons from teachers who incorporated technology consistently was 91%, 89% stated that they wanted to communicate with teachers and friends in an online environment, 92% indicated that they wanted to use supportive technological materials in out-of class activities, and 85% stated that they wanted to use computers mostly in activities such as developing web sites, creating presentations and doing homework. In addition, the study highlighted that even though the desire

for students to become digitally connected in their education was high, the actual cases and instances of this occurring was dramatically less indicating only 52% of technology utilized was efficiently in the classroom and only 49% felt that digital communication was utilized by their teachers (p. 950). From Gülbahar's (2007) report it is clear that our current educational system is failing to meet students at where they want to be and how they need to communicate utilizing the tools that have become part of their world. Including students as leaders in the learning environment aids in bringing the circle of learning and supports closer as the teachers can leverage the knowledge and understanding of the students with technology... it is their playground so to speak. These students are considered digital natives and have vast knowledge of what opportunities and outlets exists online (Crockett, Jukes & Churches, 2011). They may not know how to utilize it effectively but they are aware of it (Chu & Chow, 2011). The success of technology implementation can not only stem from a student's desire to utilize their common tools, teacher education and attitudes about how it compliments and enhances the curriculum is equally essential to establishing a learning environment that fosters the preferred 21st century skills. In order to accomplish this task teacher beliefs and attitudes need to shift to the point where they themselves live in the same environment that their students do and practice the skills that stakeholders wish to foster (Alberta Education, 2010; Skiba, 2014; Tan, 2012).

Understanding the Importance of Technology for the Modern Student

Kim et al. (2013) identified in their study that compared teacher beliefs to technology integration and found a significant correlation between the two factors, taking into consideration beliefs founded in best teaching practices and one's epistemological beliefs. This indicates that the level of adoption by teachers for the use of technology stems greatly from their own personal ideologies about education and what they observe and believe to be effective teaching practices.

Technology experience needs to be meaningful. If it is seen as a hindrance or there is no added benefit to using the technology, chances are that the adoption rate will not be as successful. Adding relevancy to materials and curriculum for students promotes engagement and generates an environment of learning, this concept is no different for teachers. (Ertmer et al., 2012; Marcoux, 2011).

Teachers are moving towards social media not only for curricular instruction and enhancement but to seek out communities and professional learning environments (Ertmer et al., 2012) due to the lack of experience and collaboration within their own school walls. In doing so they practice and engage in the very skills that they hope to instill in their students by seeking out support on a global level, problem solving and collaborating with others around the world. Ertmer et al. (2012) describes a teacher's journey in connecting her students to another class for a project with the use of Twitter. She was able to find another eager educator wanting to build global connections and together the students were able to complete a project. It is these skills that we hope to instill in our students, yet some educators become so fearful of taking that leap for many intrinsic and extrinsic reasons (Kim et al., 2013).

Barriers to Technology Integration

The hindrance that Ertmer et al. (2012) describes, gathered from participating teachers, stems from the lack of collaboration available within their own schools. When surrounded by like-minded individuals it creates an environment favourable for collaboration and communication to accomplish goals, move forward and build upon what already exists. When more than one sees the vision, the work can then begin with those people working towards a common goal (Fullan, 2011). As Kim et al. (2013) addresses, "it has been criticized that teachers have not been provided with adequate support that goes beyond learning specific technology

skills" (p.76) which has driven educational organizations to incorporate technology into the foundational structures that educators are familiar with today. The educational framework, TPACK (Figure 3), is one example of how technology has been incorporated into a common model, Shulman's Pedagogical Content Knowledge (PCK) (Koehler, 2012). Incorporating technology is no longer viewed as adding a tool to practice skills or for harvesting data but as a means to promote creativity, increase engagement and provide multiple and dynamic methods of understanding through means that were not possible just a few years ago as the revised model suggests.

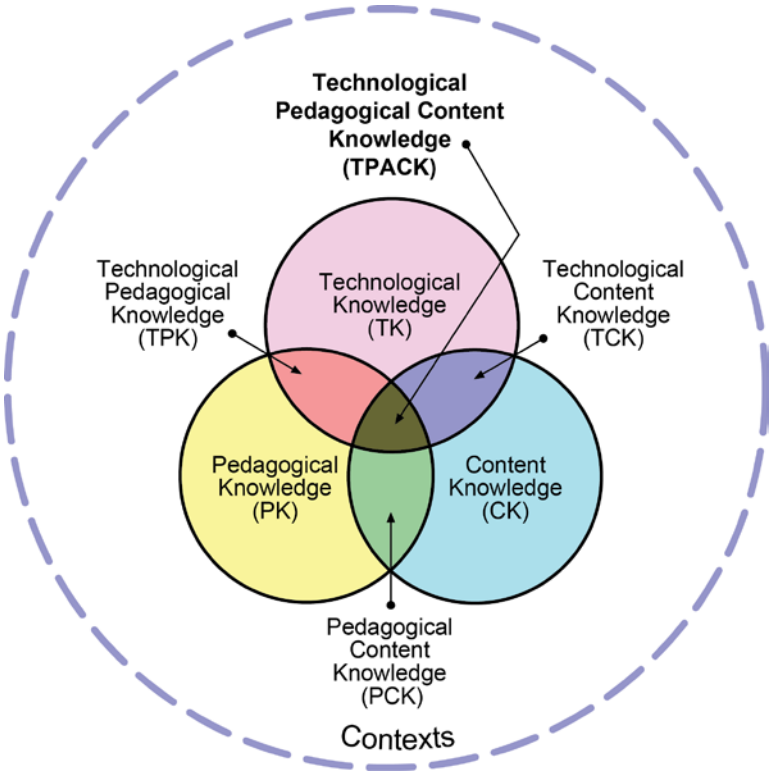

Figure 3. TPACK - Technological Pedagogical Content Knowledge Framework.

Ertmer (1999) and Ertmer et al. (2012) indicated that there are two stages of barriers for effective technology integration. First being extrinsic (equipment availability) and the second being intrinsic barriers (personal beliefs and values) suggesting that even when the first barrier is removed, through sufficient amount of equipment, proper integration still weighs heavily on the personal beliefs and values of the educator. This is evident in many situations where the purchase of equipment is substantial, yet the overall adoption of the resources have had no effect unless the teachers are properly educated on effective strategies and are provided continuous supports until they are comfortable in moving independently with the tools provided (Aldunate & Nussbaum, 2013). Teachers struggle with implementing strategies and practices that create additional work, pressure or deter from the fluidity of daily routine (Ertmer et al., 2012); unfortunately technology is not always stable and its functionality can heavily influence its adoption as Kim et al. (2013) identify as the first order barrier.

Fullan's (2011) research on change models speaks to adoption rate of new methods and innovation and how they relate to intrinsic and extrinsic motivators. Research has shown that intrinsic motivation outweighs extrinsic as the desire to change behaviours and beliefs has to come from an internal interest. Fullan (2011) highlights studies examining the rate of change when extrinsic motivators, such as monetary influences, with significant evidence that participation rates and adoption was higher when there was an internal goal achieved such as emotional satisfaction to do good or attaining personal goals. The same concept in business is applied to education where educators need to find the intrinsic motivation for integrating technologies whether it be personal pedagogical improvement or the increase in student achievement and success. When technologies are reduced to simplistic tasks that have no effect on the overall purpose, the motivators become extrinsic which "narrows the reasons for doing

something and makes it unlikely that the reason for the effort is coming from inside" (Fullan, 2011, p. 54).

Further Considerations to Explore

Some considerations that need to be further explored, beyond the scope of this project are identifiable hindrances such as the technological infrastructure of a school. Developing a solid structure for technology integration is imperative and the availability and functionality of technology can make or break implementation success. Computers are powerful tools for improving the effectiveness of instruction, however, inappropriate usage and improper technology planning usually results in loss of time, energy and fiscal resources (Gülbahar, 2007). Teachers, alongside administration, need to strategically consider technology requirements and the utilization rate compared to the culture of the school community (Ertmer et al., 2012). The state of the equipment itself can deter many from the willingness to continue using the tools as "teachers stated that the technology infrastructure was in good conditions for usage, it is necessary to increase them in terms of quantity and quality to accomplish the standards in the field." (Gülbahar, 2007, p. 953). This is often the case in many schools as speed, connectivity, updates and memory capacity of tools can slow down processes in the classroom as opposed to accomplishing that which technology is supposed to do, enhancing the learning environment. The lack of technology in schools as well as the lack of understanding of how technology can be utilized to provide these same opportunities to students on a local and global level becomes a limiting factor in schools moving into effective 21st century practices (Alberta Education, 2010; Ertmer et al., 2012; Gülbahar, 2007; Kim et al., 2013)).

Fostering Technology Integration through Professional Learning Communities

For genuine adoption of practices that integrate technology, teachers need to find the correlation to their students' success and the direct connections to their teaching (Lemke, 2010). Darling Hammond (2010) advocates for professional learning communities by indicating that the format promotes effective professional development which is “sustained, ongoing, content-focused, and embedded” where teachers work over time on problems of practice with other teachers by “focusing directly on the means by which students are learning most productively and authentically, enabling teachers to “analyze the skills and understanding students are expected to acquire and what they are in fact learning” (p. 226). Unless educators are aware of the results or end goals, there is no focus, no set direction and no intrinsic motivation that drives the implementation of innovation (Fullan, 2011). With technology, there are so many forms and variations that, within itself, is changing faster than we are able to keep up with. Educators need to look past the trivial uses and entertainment qualities of technology

> "to reinforce the habits and discipline that shape life-long learners — to ultimately foster the kind of curiosity that would compel their students to continue beyond an Internet search and dig deeper into the subject matter" (Johnson et al., 2014, p. 6).

Each of these competencies have their place in education regardless of whether a student has a device in front of them or access to computers. One of the change initiatives within Alberta Education, High School Redesign, targets this notion that competencies can be achieved and measured in a variety of formats that breaks away from the traditional credit based framework. This structure incorporates flexible learning environments, mastery of learning, personalized learning and rigorous and relevant curriculum that redesigns how we use, organize and think of time, promoting an environment “to support increased student engagement in learning, improved

student achievement and more effective teaching” to which technology can tremendously increase the success rate (Alberta Education, 2009).

Relevant Professional Development and Rooted in Communities of Practice. Tan (2012) proposes that teacher training needs to be grounded in actual school contexts. It needs to flow within what constraints schools functions under, it’s demographic, socioeconomic status, community and parent relations, or any ideologies that set the mark for what the stakeholders of that district or school feel are most important. Depending on the structure of the school environment, integrating a particular technology that fails to resonate with the culture of the school can have adverse effects that can further affect the future integration of another tool. “They must understand that they should always be critical and find out for themselves empirically what pedagogies work best for the particular student intake that the school has"(Tan, 2012, p. 188). Many schools glamour over the type of technologies they invest in, with decisions resting with the administration. Often in situations, administrator decisions supersedes that of the staff which can result in less than desired results, computer labs have been removed to encourage 21st century "learn anywhere" practices with no consideration of whether the school has the appropriate equipment, Wi-Fi and/or bandwidth capabilities to compensate for the loss of the other. In addition to the stresses of having to learn a new tool, staff is rarely consulted on what their abilities and/or comfort levels are in regards to technology. Schools become a housing facility for technology that eventually sits on its shelves as a result of low usage. Teachers’ hesitation for change elevates with the addition of district or school based change models that fail to take root or when innovation that has no bearing on the staff of the school is brought into play. In order to prevent this, a technology implementation plan needs to be customized to the school (infrastructure and culture), its staff (strengths, weaknesses, epistemology, values and

beliefs), students (learning styles, learning requirements, passions and interests) and the community (supports, funding). With a thorough understanding of a local school context, administrators can evaluate needs, address them accordingly and begin to examine what technology is best suited for their pedagogies and relevance for their school.

Alberta Education has introduced a policy that aids schools in determining adequate technology investments through the Learning and Technology Policy Framework (Alberta Education, 2013a) where technology standards and guidelines have been determined to alleviate pressures of school budgets extending beyond their limits to accommodate for technology expectations. The Learning and Technology Framework Policy guides administrators and educators through a process evaluating technology integration from five policy directions 1) Student-Centered Learning 2) Research and Innovation 3) Professional Learning 4) Leadership and 5) Access, Infrastructure and Digital Learning Environments. With analysis tools such as the Learning and Technology Policy Framework, administrators can assess their schools' technology structure and ensure that educators and students have equitable access and supports to digital learning devices and the environments that are favorable, including physical and technical requirements. This may involve redesigning classroom layouts that promote digital and collaborative learning as well as ensuring that the infrastructure of the school can accommodate the array of devices connecting to the school internet. Within Alberta, the government supports its jurisdictions by providing access to a secure and safe network and obtaining resources through partnerships with software and hardware companies that provide schools with affordable options. School authorities are then tasked with providing their educators and students with the means to access digital learning environments that fit within the scope of their setting (Alberta Education, 2013a). The policy provides added support to instructional leaders in working with

educators to determine the most appropriate strategies of integrating technology through analysis of student centered and inquiry driven instruction, evaluating the tools necessary to promote such environments. This vision becomes reality when teachers receive “adequate training and are provided with good examples on how to integrate these skills into the K-12 curriculum” (Duran, Yaussey & Yaussey, 2011, p. 99) and can begin to generate learning environments focused on new competencies.

Technologies can support learning and development of 21st century skills in new methods once unimaginable. Gaming enables students to participate in complex simulated environments that can be “highly challenging, intellectually demanding and require extensive collaborative and organizational skills” (Haste, 2009, p. 209). Diversified global perspectives, global collaboration and cultural awareness can be fostered through online communities, blogging and various networks of social communication (Haste, 2009). Innovation and creativity are enhanced through programming activities, such as Scratch (Haste, 2009) and Raspberry Pi (raspberrypi.org, n.d.) while curricular content and rigor can be housed within the constructs of these new devices and programs, 21st century competencies emerge as a resulting outcome of their integration.

Change is a long process, integration suggests just that, a slow uptake of practices and strategies. This cannot be accomplished in isolation and needs to become a community effort and vision so as to take root within the culture of the school. “This integration process is a long and painful process, a special group consisting of teachers, consultants, educational technologists and field experts should carry it out” (Gülbahar, 2007, p. 954). To eliminate the aftereffect of classroom isolation and added pressures of learning new technologies, adequate supports need to be in place for teachers to be able to access anytime, anywhere and in any means that would resonate with them. Technology and instructional leaders in a school may not be available at all

times, especially after hours, therefore one major benefit of online resources and professional learning groups is that the support can happen beyond the walls of the school and outside of instructional minutes (Marcoux, 2011). It is during these moments, when teachers can fully grasp the potential of technology in the classroom which is also one of its greatest moments of failure as there may not be technical support or encouragement when it is needed the most. Gülbahar (2007) suggests that a wide range of supporting materials and resources are made available to educators that they are able to access at any time. Well developed, easy to navigate resources can encourage educators to develop skills at their own pace and convenience thereby increasing their comfort level and capacity. To achieve this new desired reality, it is proposed that school leaders adopt a knowledge creation model of instructional leadership leveraging on professional learning communities (Cochran-Smith & Lytle, 2009; Tan, 2012). Educators have been subjected to a system of implementing curricular materials through means governed by policy and accountability measures that has been established over decades. Breaking these boundaries and questioning the means by which students are able to access, process and deliver competencies is challenging as it means embracing a shift in paradigm from one of teacher led instruction to that of personalized, collaborate learning with an emphasis on creativity and innovation (Alberta Education, 2013b) as well as the conditions to support collegiality. Hong (2012) highlights the importance of developing new curricula, in particular curricula within the context of competency based learning as “there is no universal definition of competencies…. in most cases… because different schools have different conditions “(p.35). What is applicable for one context may become irrelevant for another. With teachers being that figurehead able to identify and contextualize their local conditions, Hong (2012) indicates that “collegial efforts among teachers is critical” (p.35). Collaboration cannot be completed in isolation and requires a setting which

encourages sharing, conversation, and a safe atmosphere to practice and reflect upon the processes of the change. Cochran-Smith and Lytle (2009) encourage the framework of communities of practice as they provide exposure to a variety of viewpoints that may be difficult to visualize through the fog of complacency.

Communities of Practice Enables Teachers to become Owners of their Learning. “While change is hard, it isn't impossible and strategic instructions to new technologies are as important as what is new" (Marcoux, 2011, p. 69). As important as it is to state that the pedagogy behind the technology is just as, if not more important than the technology itself, goes without saying that the strategic plan for supports and implementation is just as important. In addition to the resources available within a school innovation shifts require the empowerment of teachers to incorporate 21st century practices into their instruction. Quite often the trend is to leap into the most popular technology available without providing the appropriate supports necessary to ensure sustainability (Ertmer et al., 2012). ”This mode of passive knowledge application and management does not give teachers a platform to practice the very skills that they are tasked to teach their students, particularly information and communication and thinking skills" (Tan, 2012, p. 185). There is no connection to student success nor the dedication taken to find critical areas in current instruction where the use of technology enhances the experience and performance for educators and their students. When teachers are able to practice pedagogical strategies within their own context it encourages them to develop their professional autonomy and take ownership of said practices (Darling Hammond, 2010; Ertmer et al., 2012; Lemke, 2010; Tan, 2012). Technology is a tool, and through this tool teachers can transform their pedagogical practices as they expand the barriers of learning to incorporate global viewpoints and experts, enhancing opportunities and experiences and increasing student choice (Alberta Education, 2013b). It is

simply a means to an end, that can produce creative and innovative results, yet the teacher, guide, instructor needs to be able to understand the nuances of that tool to be able to teach with it. That takes time, it takes research, it takes practice... not often achieved through a single professional development session as those in my role are often called to do. "It is about changing behaviours more than anything" (Marcoux, 2011, p. 69). To establish new behaviours, one must establish a new set of beliefs (Deal & Peterson, 1999; Fullan, 2011; Marcoux, 2011).

Professional Learning Communities Provide Transferable Competencies. Within a community of practice educators access the experience and knowledge bank internally through their colleagues as they are familiar with the demographics and resources available in the school. At the same time, teachers can also access external resources such as on-line professional development networks to expand their understanding and explore strategies to which other educators have implemented and provided valuable feedback as "both are necessary for the teachers to share information, discuss difficult situations, and guide and encourage the implementation of newer beliefs" (Kim et al, 2013, p. 83). They go on to apply this concept to that of classroom environments where student-centered learning flourishes in teachers who collectively share this belief, due to internal and external collaboration increase the chances of the desired practices being carried out. Customizing the learning according to the teacher's abilities and strengths, as well as needs so that teachers are learning simultaneously and within a group fostering collegiality and a network of supports is essential for successful implementation (Tan, 2012).

Long term, sustained professional development allows for values and beliefs to become rooted in practices, allowing time for small incremental development of lessons and resources, time to research and reflect on the efficacy of technology in the classroom, and above all time to

shift one's attitudes from the traditional educational structure that we have all grown in. Kim et al. (2013) identify such examples as "alternative beliefs about the speed of learning and the source of knowledge" and to shift the mind frame to that of realizing the potential of achieving similar beliefs and values but in a more effective manner allowing greater time for coaching and facilitating student learning (p. 84). Ertmer et al. (2012) confirms this by stating when developing models that encourage and stimulate technology integration in schools there should be in place communities of practice or professional learning groups designed to strengthen the overall competency and capacity of technology embedded within pedagogy. Through the collective experiences and insights offered by the individuals within a professional learning group teachers can leverage knowledge and develop higher quality instructional strategies that can better meet diverse needs of students (Chu & Chow, 2011). Within their study Ertmer et al. (2012) received feedback that one of greatest barriers to one's own technology integration was the beliefs and attitudes of other teachers, suggesting that when there are varying beliefs about a particular issue or initiative. Unless the entire group moves forward with the same vision… there will be no progress (Kouzes & Posner, 2010).

By observing and reflecting on practices of others, internally and externally, teachers can begin to evaluate best practices they witness compared to their own. Through this reflection the beliefs that teachers have about their current practices can begin to evolve as they are able to see the benefit of others' pedagogy in action, there by breaking down the second barrier that Kim et al. (2013) and Ertmer et al. (2012) indicate as a hurdle to technology integration. They go on to suggest that through collaborative teacher professional development opportunities are available for observation where teachers would be able to witness promising and effective 21st century strategies facilitating reflecting on their own practices. Fullan (2011) states that practices drive

behaviours and beliefs and that “new theory is the product of considered practice” (p. 13), and by considered, refers to that practice which is reflective. For new strategies and theories to drive change in education, reflecting on ones’ own areas to develop while comparing and contrasting similar situations provides educators with the opportunity to identify strategies that could be integrated. As educators are able to see first-hand how the integration of technology occurs in other classrooms or schools, can they now begin to envision how it could look in their own environment (Kim et al., 2013). This process of personal reflection becomes a powerful tool in change as it provokes one to gain insights of oneself that may have once gone unnoticed (Fullan, 2011).

By participating in communities of practices centered on technology integration, teachers are exposed directly to the various learning tools to a higher degree as the technology is embedded into the practice. This way teachers are learning, collaborating and communicating with the very technological pedagogies they need to instill in their students. Reaching out to and within the educational community through the use of technology not only extends the reach of professional development specialists, it also fosters the very 21st century competencies that educators are expected to develop in students. "Students and teachers become less isolated with technologies" (Marcoux, 2011, p. 70) webinars and online communications can provide educators with an abundance of resources at their fingertips. Many educators lack the time to collaborate in-person during the school day, if at all during the small breaks, preps or between supervision shifts. Opportunity to collaborate is sparse during these minute times and for teachers to enhance their skills they need to connect socially, whether virtually or face to face, as they spend majority of their day in isolation with little to no adult communication. Teacher conferences provide the opportunity to learn, however, as with drop in professional development

sessions, there is no time to learn new strategies, practice them in class or make them relevant (Cochran-Smith & Lytle, 2009). Online learning for educators, through mediums such as Twitter or Pinterest provide teachers a means of communicating with fellow educators on their own time. With many of these social media services, reading daily bogs or browsing through pictures of what's happening in fellow teachers' classrooms can be completed in the limited time teachers have in a day (Marcoux, 2011). As teachers begin to see the value of participating in such communities their practices, understanding and capacity improves and as a result their beliefs can begin to evolve to include this structure/practice into their own pedagogy (Cochran-Smith & Lytle, 2009; Fullan, 2011; Noddings, 2007). Having direct involvement in the reflection of pedagogical practices, witnessing the effect on student learning and resulting competencies acquired gives educators a vested interest in the transformation they hope to establish (Fullan, 2011). Cochran-Smith and Lytle (2009) favour positioning teachers in the centre of the process of deciding what needs to be changed and the means of implementation as they are the "central determining factor in educational success and are the linchpin of reform" (p. 124). When practitioner takes the stage as instructional leader, that teacher takes ownership of their position to change. It becomes a personal pedagogical goal to enhance student's life chances as a consequence of their effort and become more receptive and committed to change. Their own ideals and subjectivity are taken into account resulting in shifts in their own belief system as to what is the best practices for ensuring student success.

The Blind Leading the Blind. "The quality of professional learning communities in the school can only be as good as the quality of training and development that teachers have received" (Tan, 2012, p. 189). In order for successful integration plans to exist in schools, teachers need to be trained effectively and need to understand the tool before praxis can be

improved (Tan, 2012). So when does this training occur, who will deliver it? When is there time for it? Is it essential to prepare those who are to be the instructional/technological leaders/coaches with sufficient strategies and knowledge to support other teachers within their building/sites (Tan, 2012)? The shifting landscape of educational objectives and outcomes, as indicated by Noddings (2007), fosters the development of competencies that enable students to become innovative problem solvers with the ability to adapt to a variety of situations demonstrating effective communication skills that expands to a global level. In order to accomplish this goal for students, teachers need to adopt the very strategies and practices that are expected of their students (Kim et al., 2013). Students need to be able to see the process modelled by the very educators that they are learning from. Kouzes and Posner (2010) elude to this element of leadership, modelling the way, which applies to both administrators and to teachers.

Shifting the Culture of a School that Supports and Fosters Technology Integration

Successful shifting in school cultures requires the cooperation and contribution of all members of the organization, rarely has there ever been longstanding shifts in the environment of a school due to one person's ambitions. These monumental changes are often only witnessed in over exaggerated Hollywood versions of school leaders. Yet even in movies that depict the lone hero who changes the face of a decaying school the true power behind the change is always the relationships that evolve between all members of the community; administrators, teachers, students and parents, which work together towards a shared vision. (Fullan, 2011; Tan, 2012).

Components of School Culture.

Part of school culture is driven by curriculum. What concepts are taught, which aspects have more meaning or are emphasized more than others, what the community of the school values as non-negotiable knowledge which becomes required for

every student passing through their system. All of these contribute to the culture of that school. Depending on how well that culture has been established usually determines the sustainability of the elements that form that culture. It is in this space where technology needs to live, not as an accessory to a school nor as a fad that will find its way to a storage room closet within a few years, but as a fully functioning organ of the greater whole (Gülbahar, 2007). That in itself can become a bit of a challenge as technology is unstable. Schools can purchase thousands of dollars of equipment to make their school environment more appealing to the general public or to prove to their stakeholders that they are leaders in 21st century learning, however, unless that technology is changing the ways in which students are learning which would not be possible otherwise, then there is no progress. It simply becomes a different way of doing things. Healthy technology integration needs to focus on doing things differently. Students gathered around an iPad while taking turns on an app that teaches words from a different language is no different than repetitive lines on a worksheet. Although animations can bring a certain level of engagement for the student, replacing repetition with genuine experiences in language instruction through face to face communication with a peer half way across the world in their native tongue, is doing different things. It is through those experiences that raise the quality of education which has been made possible through the assistance of technology. It's not to say that this was never possible without technology, rather that it was not feasible for all students, such experiences were left to the most fortunate able to pay for school trips to Montreal, Italy or Spain to be immersed in the language and the culture. It is also necessary to state that these authentic experiences are and ever will be as valuable yesterday as they are today. Technology can never be a substitute for those moments where students become fully immersed in their learning through physical presence, what is does allow for, however, is that ability to enhance learning

throughout the school year to all students rather than only in the limited time frame and often only available to those students with adequate financial means.

The culture of a school can also be influenced by what their indicators of success are. Schools that measure success by their academic, sports or ideological philosophies structure their mission and visions around these measures. Understanding this can assist in identifying where technology integration will succeed and fail as schools often have no room for technology in their mission statement or emphasis that is dedicated to embracing or implementing technologies. Technology ends up becoming a crutch rather than an integral part of their measure of success. Within my own jurisdiction technology has become part of Edmonton Catholic School District's mission and goals which then transcends down to individual schools as each site's goals and mission are expected to reflect of those of the District. "Success is defined by how their students reach their learning potential" (Deal & Petersen, 1999, p. 26) therefore for schools to measure their success in implementing technology, schools would need to observe and assess modes of differentiated learning, performance assessments, project-based learning, student centred inquiry and other transformative learning models made possible as a result of technology integration. Schools which fail to make accommodations and modifications to learning environments and accounting for the technology that their schools are hoping to integrate will not have a definitive method of measuring these objectives (Alberta Education, 2013a).

Shifting Culture Occurs at the Root Level. Shifting school cultures towards technology integration involves so much more than a variety of short training sessions from external experts extending their support as a Band-Aid solution (Darling Hammond, 2010). As Deal & Petersen (1999) indicate shifting school culture requires shifting the paradigm within that school, shifting the mind frame of the staff, students, parents and administration, hence shifting the school

culture. In order for technology integration to happen successfully within districts and schools its intents and purposes need to take root in that which is the sole goal of education, best possible chances for all students. If teachers do not see its value and have it ingrained in their beliefs that changing from teacher lead instruction to student-centered learning is of worth, there will be great resistance from educators to put these practices in motion and achieve sustainability (Fullan, 2011; Hong, 2012; Kim et al., 2013). Hong (2012) analyzed competency-based instruction development where the staff of an Australian school stressed the success of implementing technology to support competency-based learning to the "teachers' commitment to aligning their teaching with the philosophy and principles of the school" and that the "school teachers' collective efforts made it possible to revise their curriculum to be more competency-based and thus provide more updated and engaging lessons" (p. 33).

Deal & Petersen (1999) identify norms, values and beliefs that exist within each school site that can have tremendous positive effects or irreparable consequences as they will often dictate the direction of the culture of the school and the relationships that develop within. Positive norms serve to promote and enhance the school environment rather than hinder the progression towards change for the betterment of students and "values are the lens through which we interpret the world, tools for making sense" (Haste, 2009, p. 212). It becomes essential to instill, within an educational community, values and beliefs of technology as a method of increasing student comprehension and success as well as the foundational components that create situations for promoting fruitful learning such as student-centered inquiry. In order for the practices to take root within the system professional development as well as the vision and beliefs of the entire school community need to be taken into consideration so as to establish a

culture reflective of the ideologies of the school (Deal & Petersen, 1999; Ertmer & Ottenbreit-Leftwich, 2010; Haste, 2009; Kim et al., 2013)

School Leaders can Foster Technology Integration and 21st Century Competency Education. Historically principals have been regarded as the sole leader in the school system and Hoerr (2007) suggests a reason being is that the principal "had more skill and knowledge than anyone in the building and would guide others in how to teach" (pg. 84). 21st century practices and environments has spurred the growth of professional learning networks beyond the school walls. "Not only has the knowledge about learning mushroomed… teacher expertise has also grown" (Hoerr, 2007, pg. 84). Current belief is shifting to a culture where teachers themselves are becoming as knowledgeable as the principal once was, thanks to the accessibility of learning networks and resources in various multimodal formats. Distributed leadership empowers teachers with their growing knowledge and repertoire of tools to enhance student achievement. Administrators have the ability to create an environment to foster such desires resulting in forward change momentum. Teachers are no longer looking to administration for answers to pedagogical strategies, as much of it is now accessible through on-line environments rather looking to their administration for support and opportunities to be involved in initiatives focused on improving student learning (Hoerr, 2007). Whether this be through professional learning networks, coaching support from master teachers, inter-school visitation to observe best practices or communities of learning providing opportunity to strategize and revise practices, administrators need to be the driving force to ensure these situations are created. Hoerr (2007) builds upon Barth and Guests' (1990) framework to develop collegiately amongst educators through: talking together about students, developing curriculum together, observing one another teach, and teaching one another to include a system that practices distributed leadership whereby

teachers along with administrators collectively developing a structure intended on shaping school culture around a set of issues. Through identification of issues for the purpose of improving student success, in particular integrating technology effectively teachers gain the opportunity to become highly competent in global expectations (Alberta Education, 2013a).

When establishing school culture, specifically one that promotes and encourages the effective use of technology to develop strong 21st century skill and competencies, administrators need to be able to share the beliefs in order to steer the direction "to model effectively, you must first believe in something" (Kouzes & Posner, 2010, p. 10). As administrators begin to plan their technology integration, it would be advantageous to evaluate and observe staff, paying attention to current beliefs and values, find a common vision for all to adopt then provide the opportunity to enable their staff to achieve success in the areas identified (Fullan, 2011; Kim et. al, 2103; Kouzes & Posner, 2010). School leaders need to be cognizant of the abilities, needs, and opportunities available for their educators so as to prevent ineffective professional development and training models. (Fullan, 2011; Tan, 2012). As Kim et al. (2013) emphasize, for effective technology integration the "crucial condition for change is the active involvement of leadership" suggesting that the administration take a position in a climate of change to become the individual responsible to ensure that the teachers experiencing the changes are supported in every aspect. In this, teachers are empowered to create an environment of change and are scaffolded appropriately to be able to "overcome their weakness and accelerating their strengths” (Ellsworth as cited in Kim et al., 2013, p. 83). There are many facets to the role of the school leader that can assist fellow educators in becoming successful with innovation and change systems. School leaders need to focus on setting the vision and goals, provide encouragement along the way then providing the appropriate supports for achieving that vision (Tan, 2012). ”School leaders have to

proactively promote the professional development of all teachers" (Tan, 2012, p. 189) Teachers interviewed and surveyed by Ertmer et al. (2012) indicated that the level of support and encouragement by administration strongly influences the adoption of technology within a school climate. When administrators incorporate technology within school plans and goals, there is accountability to provide support for those goals, assess utilization and re-evaluate the technology plan to best suit the school environment and culture. Darling Hammond (2010) highlights scenarios of professional development sustainability with the culture of a school that hinge on the ability of the school leadership to drive and maintain the momentum for the school. With school leaders being woven into the fabric of the professional learning communities they are in a position to better understand the skills of their teachers, the nuances of the curriculum and the needs of their students rather than taking the role of the outside evaluator. They in turn become vested in the growth and change of the school culture. School leaders need to be able to provide adequate and necessary supports for their teachers to foster and promote the pedagogical changes expected. "Fundamental changes do not happen quickly or automatically. In order for the sustained growth and positive changes in teaching practice to occur, incremental supports should be provided, and the supports should be ones that satisfy progressive needs for change" (Kim et al., 2013, p. 83).

Conclusion

Throughout my educational career I have been presented with opportunities that have required me to take on leadership roles, in which I have experienced varying degrees of responsibility as well as the diplomacy that naturally follows. Each position has exposed me to a variety of situations where my actions and communications differ depending on the context. I have gone from lead teacher in a new school providing policy, procedure, scheduling and

instructional supports to acting assistant principal where I coordinated and delegated such supports; evidently shifting the dynamics of relationships and level of responsibility in seeing the structure take form. My current role as technology consultant for the district requires collaboration with fellow colleagues and educators in establishing cultures of change, advising technology plans as well as developing and delivering necessary professional development that sees the vision of Alberta Education (2013b) come to fruition within Edmonton Catholic Schools. Much of what my responsibilities entail requires establishing a culture and environment of change within the district, school and classroom. Observing and assisting teachers in integrating technology in their classrooms provides me with an understanding of where teachers are needing supports, what barriers they face in relation to technology integration based off of conversations throughout the process as well as providing feedback to administrators who are concerned with how the staff and students of their building are responding to and incorporating technologies as part of the growth of the district and the province. Often the conversations that ensue with administration involve inquiry into what technology supports I can provide to bring their school culture into the 21st century of learning as well as what technology they should buy and how to best utilize the spaces within their schools that foster the development of 21st century skills, as indicated by several researchers (Chu & Chow, 2011; Crockett, Jukes & Churches, 2011; Haste, 2009; Noddings, 2007; Tan, 2012). Through the research of technology integration in schools (Ertmer et al., 2012; Kim et al., 2013), one common thread becomes evident, that there is no one finite solution for technology in education and that technology is not the means to which 21st century learning is accomplished but through enhancement and evolution of pedagogy that technology makes possible. Building off what I have discovered from the research, I propose a technology integration plan that I will use when assisting schools that focuses on approaching

the change through identification of where it fits into the culture of a school and developing appropriate professional development to support sustainability.

Chapter 3: Project Plan

Introduction

The basis for this project is to outline how to accomplish change environments within the context of technology integration by establishing the change within a school culture. The research in the literature review demonstrates that technology is becoming an integral component in the education as it provides the outlet that enables students to achieve the best possible results, specifically in 21st century competency-based outcomes. Technology is used in a variety of settings from enabling real time research and processing skills to fostering innovation through creativity apps and coding simulators that teach students programming languages. Technology also serves to reduce the barriers of traditional classrooms by reaching out to global learning communities through social networks and communities (Ertmer et al., 2012; Marcoux, 2011). Teachers are able to bring experts and experiences from around the world with using the very tools in their pockets. These technologies are becoming evident in the goals and framework set out by the Government of Alberta that calls for students to become engaged, ethical citizens with an entrepreneurial spirit (3E's). Alberta Education's cross-curricular competencies will serve as the vehicle in developing the 3E's in the students of our future (Alberta Education, 2013b). Edmonton Catholic Schools and several other districts within Alberta have responded to the call by participating in processes of curriculum redesign and reshaping the educational system through the lens of *Inspiring Education*, a conversation of stakeholders in Alberta that have devised a vision as to what the future of education in Alberta looks like. These students are

called to become globally aware and educated on effective collaboration and innovation; all of which are achieved through the aid of technology (Alberta Education, 2013b).

Although technology has been identified as an integral component to the betterment of student achievement and success, there has been a variation in the acceptance and integration of said technologies from district to district, school to school and especially class to class (Crockett, Jukes & Churches, 2011; Ertmer et al., 2012; Kim et al., 2013). Acquisition of technology being a definite factor to the extent of usage that some rural Alberta school districts experience, as addressed during provincial jurisdictional meetings. Many of these smaller districts struggle with inefficient bandwidth or accessibility of devices largely due to insufficient funding. Edmonton Catholic being one of the four largest districts within the province of Alberta experiences struggles of a different nature where the number of staff becomes an obstacle in meeting the needs of every member of the district community in ensuring that they are receiving the necessary supports to integrate technology effectively. Regardless of the specific issues that schools and jurisdictions face to the availability and access of supports, one critical factor to the sustainability of practices affected by the contextual environment, namely the culture of the school.

This project plan will serve as a framework, adapted from the Learning and Technology Policy Framework containing criteria for technology integration fulfilling the expectations of Alberta Education supported by research on effective professional development practices within the context of implementing change within the culture of the school. It will outline the process by which, with the assistance of an external educational consultant, a school site would develop a technology integration plan situated within the culture of the school environment for sustainability. This process moves through an initial communication structure involving all

relative stakeholders within the school community including administrators, teachers, students, parents, support staff, educational consultants in establishing a common vision and goal for the school community. Based on the dialogue, identifying individual's desires for further learning and skills development, professional learning communities will be formed so as to provide groupings with common ground and understanding. Within each of the communities, school leaders will facilitate sessions that run within the context of the classroom environment to ensure tangibility and relevancy of the learning environment in accordance with the technology infrastructure of the school including physical limitations of hardware and software access.

Rationale

Technology cannot be seen as a solution to the issues of creating 21st century schools. Learning is still dependent upon the facilitation and pedagogy of the teachers. My experience in schools has shown me that regardless of the technology being introduced, unless there are appropriate supports in place for educators, for example learning methods for technology to improve the learning environment, initiatives will fail to take root. This lack of sustainable long term change opens the door to reintegrating old habits and methods. These supports come in various forms yet the most successful and sustainable, as I have experienced, is when shift in pedagogical thinking and approaches, with technology integration, is a school wide effort that has become part of the culture of a school rather than incremental additions to enhance a lesson.

Drawing from Fullan's (2011) research on change systems he identifies several stages for effective change models that proves effective for both school leaders and educators taking part in the process. As an educational leader that provides schools, administrators and teachers supports to improve and cultivate the use of technology in the learning environment, these stages serve as a guide to formulating an effective technology integration strategy. The foundations of the

process takes into account the strategies Fullan (2011) describes as necessary for sustainable change within an educational setting which are woven into the framework of the project.

Project Implications towards the District and my Current Role

Edmonton Catholic Schools has embarked on the journey to move towards 21st century learning by providing schools with long term supports that enable schools to facilitate the change within school cultures through Transform (Transform, 2012). Transform was established to prepare teachers within Edmonton Catholic Schools to the changes in education established by the Government of Alberta, which declared through its mission statement, that "inclusive learning opportunities that enable students to achieve success as engaged thinkers and ethical citizens with an entrepreneurial spirit" (Alberta Education, 2013b, p.1) will be ensured throughout the province. This structure addresses the changing expectations of learners and students which have evolved from subject specific outcomes to levels of competency which are cross-curricular and applicable to a variety of situations and future aspirations. Much of the change in expectations are driven by the changing face of society where creativity, ingenuity and global collaboration are regarded as the highly desired qualities in an adult rather than meticulous factory based skill set or aptitudes. Technology is seen as the driving force behind much of this change as well as the tools to which these new competencies can become a reality for students.

Much of the struggle that schools experience is the lack of sustainability of a particular type of technology for many reasons. Kim et al. (2013) and Ertmer et al. (2012) addressed several hindrances to technology integration that dealt largely with accessibility of technology and resources, lack of support networks, limited time to develop comfort and competencies with technologies as well as the beliefs and attitudes to teachers' abilities in themselves and the

technologies in use. The project addresses these points by developing strategies to accommodate these roadblocks with appropriately developed professional learning environments within a relative context of the school demographics and technology availability to increase the competency and comfort level and the network of supports.

Based on my experiences with schools, each site is at different levels of integration with a variety within of the expertise and experience of technology use, each with a different need, often dependant on the culture of the school. At times, I have some choice and selection in when and to what capacity the assistance is given to teachers, with a portion of our time dedicated to determining the needs of the individual and the best solutions for their situation. I find that as I cycle through sessions with teachers I can identify groups with similar goals and needs that would work well as a collaborative learning group for an identified technology. In situations where technology integration was less than optimal, a process of organization sessions with the teachers including dialogue and planning for best supports prior to would have been the necessary component to the professional development. The preliminary dialogue allows for a relationship to form with those in the community, a chance to share in their personal beliefs, values, ideas of technology use, goals for improving students learning, and alignment of pedagogical beliefs and values in relation to the scope of Alberta Education's vision for 21st century learning through the 3E's and the cross-curricular competencies. By participating in conversation to establish where the teachers are at, where they want to be and what it would take to get there, its purpose is to develop a common language and setting in which myself and the community are able to work. Typically previous interactions with teachers would result in each have their own ideas and areas of growth, taking a few hours of time to complete one simple task within the classroom using technology in some way with their students. While this process has

been a common way in which professional development has been delivered in the district to a great population of teachers, its effectiveness is not been evident. For myself, there is no consistency, there are no common goals to work towards and no sense of collegiality amongst the school which is a necessary component of change models (Fullan, 2011).

Based on the research from Fullan (2011) the first step in effective change leadership is placing relationships at the front of the process. It is through understanding the culture in which we are asked to guide through the process as it sets the stage for the remainder of the process, the cooperation and level of collaboration and commitment from the group. In addition to the continuity of language and expectations for each individual, the process can remove potential internal barriers as there is a means of communication for those teachers wanting to learn from and work with their colleagues. People tend to shy away from conversation in groupings where the content discussed is unfamiliar. This is evident within my own department as the focus and attention of individual falters as technology terms emerge during the conversation steering the dialogue into a different direction. Those unfamiliar with the terms instantly lose interest or check out as they feel that they have no connection to what is being discussed. Often a simple shift in terms using a consistent language is all that is needed to involve everyone in the conversation. Establishing this consistency at the beginning of change systems places common ground for the group, aids in determining the best possible course of action for professional learning communities and begins to create a network of supports within the change system.

The plan will identify each stage of the process with a description of what needs to be accomplished, supported by the research, backed by my experiences in these situations and how each stage contributes and is essential to sustaining change within the school culture. The stages follow a systematic path beginning with the process of dialoguing to establish a baseline for

technology as well as individuals' levels of competence and level of adoption. After initial dialogue, which would continue throughout the remainder of the stages as check in points necessary to adjust progress, is the process of identifying the goals and vision that will serve as a guide for change as well as the purpose of the process. Once targets have been established, based on conversations with all intended parties, professional development models are organized around the context of the existing school environment and relevant to the intended goals and vision which must be determined together to ensure teachers take ownership in that which they want to achieve (Fullan, 2011). The final stage of the process is to share the culmination of successes and achievements teachers experience during their journey that serves as a reflection to the process and as an encouragement to continue improvement.

Framework of Technology Integration Plan for Schools

My goal is to facilitate this process of technology integration from the perspective of determining the pedagogical and 21st century aims that the school and its staff hope to achieve. To support the various stages, my role would be to initiate, facilitate, mediate and document so as to guide participants through the process towards the selected goals and vision (Cochran-Smith & Lytle, 2009). Often when working with schools I am called in to assist with one or more teachers in order to provide guidance through that often challenging process. While some progress can be made with individuals, depending on their level of adaptability and openness, as well as the personal and external barriers they may face (Ertmer et al., 2012), the ability for the advancements to disperse throughout the school community in enhanced. Others are able to continue the enrichment of curriculum to the students in all areas of their education. Based on my experiences, greater progress is made through communal efforts as success can extend to all

in the community providing higher chances of recognizing the achievements made, coupled by the opportunity to celebrate resulting accomplishments (Fullan, 2011).

The Learning Technology Policy Framework (Alberta Education, 2013a) provides an outline that administrators, educational leaders and teachers can use in determining the level of technology integration that supports an environment conducive to the aims of Alberta Education: creating ethically, engaged students with an entrepreneurial spirit (Alberta Education, 2013b). The framework offers an overview of determining to what degree of adoption and integration schools find themselves compared to the provincial standard of acceptance. Although the framework serves as a guide and aids schools in identifying their areas of growth as well as a source of information, it fails to take into account what internal barriers (Ertmer, 1999; Ertmer et al., 2012) may be present and contributing to the lack of adoption nor does it suggest the best course of action to support educators through their journey of technology integration. The technology integration evaluation process that I outline draws from the Learning and Technology Policy Framework, change leadership and professional development research as well as my own personal experiences in delivering and developing sound professional development. The following technology integration plan will assist in developing and fostering professional relationships within the group, as well as with myself, the facilitator, determining a set of achievable targets related to an achievable set of goals and set a collaborative plan of action.

Stage One: Dialogue

Dialogue should begin with administration. As leaders of the school community administrators are tasked with not only school operations and budgeting concerns but with ensuring that the goals of the school are reflective of those of the province as well as the district. With this comes the responsibility of ensuring that the teachers of the school are provided with

the necessary network of supports to assist with the developments and changes of pedagogical practices that are evident in the province and around the world. Administrators need to know their staff, understand their strengths and areas of growth. They do not necessarily need to be the solution to their frustrations and challenges but need be able to access the level of supports which can provide them with the guidance they seek (Fullan, 2011). I was asked by the administrators of one school to come in and work with the teachers on increasing their technology capacity, specifically on the use of the virtual classrooms, and in speaking with the teachers briefly in the staffroom prior to the afternoon session I discovered that there really was no clear direction given to them from administration in what to expect from the session or the direction the school was taking in general. There was a varying level in the understanding and experience of the teachers that also commented on the fact that they felt some animosity in being asked to improve their practices when they had already felt that there were many other obligations assigned which took priority over technology use. This lead to a very challenging session as teachers spent majority of the time checking emails and marking papers rather than building upon the skills that they were asked to focus on, not to mention that the administrators who initiated the session were absent and therefore not able to clarify their intentions and objectives for the class sites. As mentioned, this type of cultural shift in schools requires the commitment and support of the administration in order to have a chance of success. This contrasts an experience with another school where, prior to the session, I had the opportunity to speak with the teachers, together with their administrators, in an open format discovering what knowledge and experiences they currently had, where they would like to see themselves move forward as well as the overall goals for the school. From this dialogue that involved the whole teaching staff, including the school leaders, it was clear that one single session geared towards one particular strength was not a

viable option and a plan was developed targeting groups of varying levels over a series of sessions. If administration had not been a part of the dialogue process they would not have had the opportunity to understand the needs of their staff and develop a positive support plan with their feedback.

Obtaining the information through focused conversations can be accomplished through various formats including; one on one dialogue, group conversations, classrooms observations with follow up discussion and surveys. The overall key in these dialogue session being successful is having the full participation of all members, including school leaders, in sending a consistent message that their thoughts and opinions are validated and taken into consideration when planning for the change (Fullan, 2011).

Dialogue is an essential component to establishing a vision and direction for change, whether it be through a top down initiative or group developed plan, there needs to be an effective process for communicating the goals so that all vested individuals are on board. Unfortunately when change occurs in a currently established system, those who have embraced the comfort of conformity have a more challenging time with adjusting and adopting the changes. Much of this is contributed to by the fears and anxiety in ones' own abilities when it comes to the technology itself (Ertmer et al., 2012; Kim et al., 2013) which can also be indicative of a person's ability to face challenges or take risks. From my observations when working in classrooms, students are not afraid to take risks. Perhaps this is because they have not been clouded by the possibility of failure or that they are digital natives where the use of technology is as second nature to them as was technologies of our generation's time. Thinking back to the tools of our trade; pen, paper, word processors, and typewriters, learning was much simpler then, as too were the expectations. Now with the complexities of technology there is an increase in the

chances of errors. When pens broke, the solution was to grab another. A pencil became dull, sharpen it. Simple. When functionality of computer or iPad fails, we face the possibility of losing all of the progress made up until that point. It's easy to see why some teachers have little faith or high anxiety in using a tool that could potentially cause them additional stress. The solutions to these complexities require a sense of resourcefulness and flexibility. Much of these qualities stem from understanding where one can turn in situations of struggle which could be anything from an online search to asking someone knowledgeable. Part of the challenge is identifying where to turn and developing a relationship with members of the community to be able to comfortably engage in conversation of topics that can potentially expose a person's incompetency, a common situation I have observed in schools. With the process of focused dialogue, teachers can begin to identify those with which they can turn to while those with the knowledge and resourcefulness can identify the stage in which others are at and engage in a supportive position as they are able to understand their needs to assist them in moving forward (Cochran-Smith & Lytle, 2009).

Recently I supported a school, on a weekly basis, working with the teachers towards technology integration. The first teacher I worked with was leery with technology and often avoided it as she experienced complication after complication when attempting any sort of projects with the students. With my assistance she became more confident in her ability to start a project, let go of some control in the class and allowed students to demonstrate that they were highly competent in areas that the teacher struggled in when it came to technology use. By the end of our week together she had developed a stronger sense of technology use through observation, guided practice as well as learning from the students themselves as she began to ask them for help with steps in the project. The project became a huge success for this particular

teacher and we began to engage in focused conversations about the project in the staffroom over the lunch hour. As we spoke openly about the happenings in her classroom, interest began to peak as other teachers noticed the excitement of this teacher, commonly known for her lack of technology use in the classroom. As we celebrated the successes, others took notice and participated in the dialogue to inquire about what she had done, how the students responded and what they were able to accomplish through this project. The teacher was more than happy to share her experiences and became confident enough to invite colleagues to work on a joint project using the same tools. The conversations continued throughout the week and when the time came to work with another individual, the level of engagement was high and resulted in a successful residency that continued beyond my involvement. If dialogue had not occurred, which created inspiration for others in the community, the teachers would not have been able to increase their confidence in sharing and collaborating which overall took the teachers from employees to colleagues.

Initiation of the dialogue stage can occur at any time during the year, ideally having this process begin at the start of the school year as teachers are preparing their year plans and goals according to the district schedule. In understanding what direction educators should take is the ability to create a sense of purpose (Fullan, 2011). Teachers need a reason to improve upon their practices and venture into new territory. By establishing a purpose to the change, it begins to form the vision that binds the group towards a common goal. This common goal drives the collective and establishes a measure of accountability to determine the success of the change. In establishing a purpose the following guided questions serve to determine common ground in identifying competencies, pedagogical and physical needs as well as personal beliefs and values.

These questions could be included in one on one conversations, the driving question(s) during focused group conversations or through an independently completed survey.

The dialogue focuses on identifying where the individual evaluates their technology competencies and understandings compared to that of the school culture and with that of the provincial direction. Depending on the educational role of the participant, questions would be tailored to the individual. Some examples of questions would be:

Is technology integration for the procurement of 21st century learning competencies in students practiced on a regular basis?

If so, identify which specific technologies is integrated and provide examples, if applicable, of situations where this has been evident.

If not, what roadblocks are present that prevent the use of technologies to foster 21st century learning?

The second part of the dialogue consists of questions about the direction that Alberta Education is taking to ensure students are receiving an education based on the 3E model and the cross-curricular competencies (Alberta Education, 2013b). Examples of this would include:

Looking at the cross-curricular competencies, as indicated through the Ministerial Order, which of the competencies are evident in your students the most?

Which of the competencies would you like to see further developed in your students? Which competencies do you feel are most essential as an adult?

These series of questions could be used in one on one interviews, within group conversations or through online surveys as demonstrated in figures 4 and 5. Questions for teachers should be

tailored so that it initiates a reflective process with student learning as the lens to which they respond. Questions for administrators and school leaders should be reflective of the overall practices of the teachers related to the expectations of Alberta Education. See Appendix for a full listing of dialogue questions.

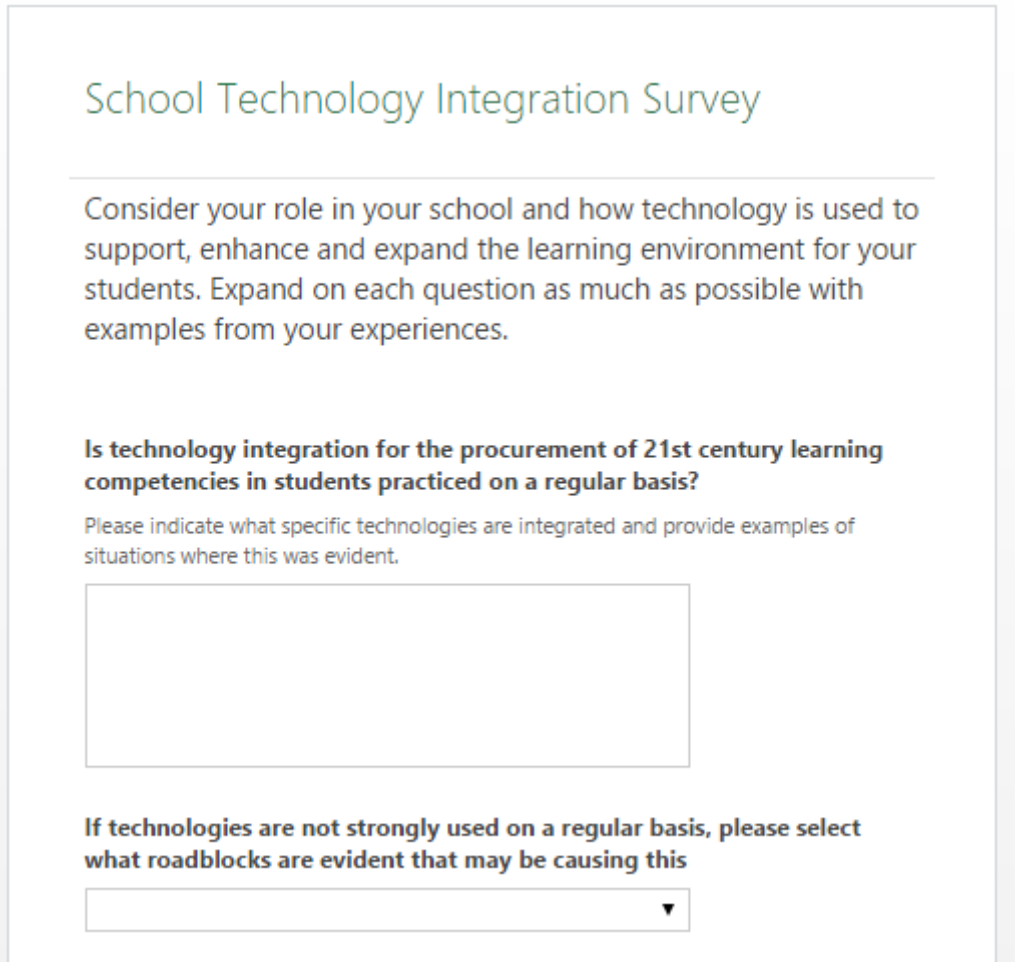

Figure 4: Survey questions for school evaluation of technology practices

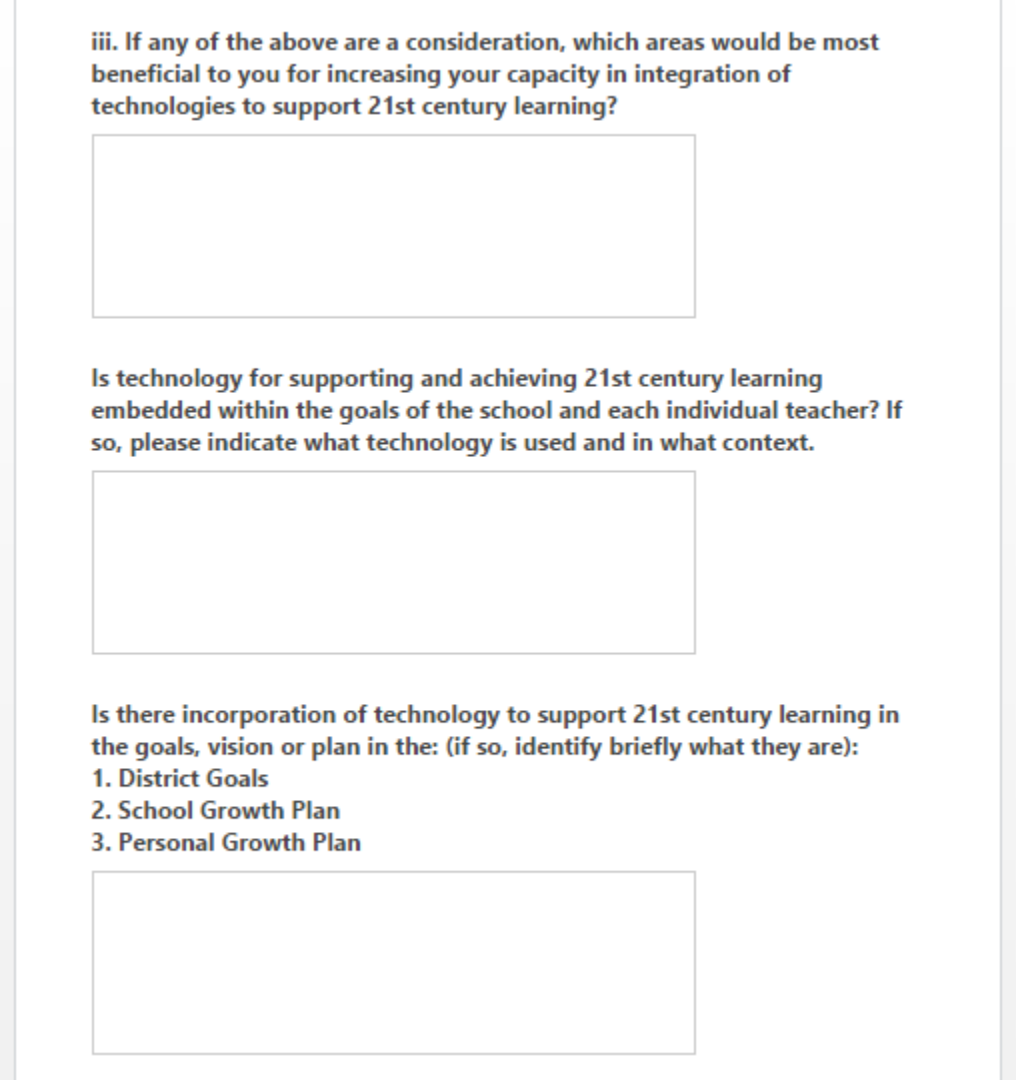

Figure 5: Survey evaluating personal technology practices

Dialogue that focuses on the indicated questions can begin to highlight areas in which administrators, school leaders and teachers deem necessary to focus on which moves them into the process of identifying goals and a vision for integrating 21st century learning throughout the culture of the school.

Stage Two: Goals and Vision

Fullan (2011) and Kouzes and Posner (2010) indicate that the key component to sustainable change is to identify the goals and set a vision for the change. This becomes the target that all stakeholders look to when facing the everyday challenges associated with implementing change, or as Fullan (2011) describes, “the implementation dip” (p. 71). This directive, can only be as effective as those that initiate it and within a culture change all participants should ideally embrace and take stake in the goal, not due to a directive but through the collective development fostering ownership of the intended goals.

In order to ensure effectiveness and sustainability of the change process, the goals and vision should reflect the following:

- Identification of the goals of the school in relation to technology use and determining the overall expectations and desires for the student body that are in line with the 21st century competencies and Alberta Education cross curricular competencies (Alberta Education, 2013b).
- Identification of individual strengths and areas for growth that stem from the dialogue. Teachers will identify what specific goals they have for themselves as well as their students. By identifying these areas and analyzing the strengths, experience level and position on the adoption of innovation curve (Rogers, 2010).
- The goals and vision need to be relevant to the context of the school (Tan, 2012). If there are no mobile devices available, then mobile learning and possibly other competencies should not be explored. The intention of the plan is to work within the possible.

- The goals and vision need to be a communal decision so that all parties have a vested interest in attaining the goal, the teachers become owners of their achievement and progress rather than recipients (Haste, 2009).
- The goals and vision should have a simple plan, avoiding complexity with multiple points of achievement so that the end is attainable for all. Setting goals way out of the reach of those inexperienced can set the system up for failure (Fullan, 2011). The school will automatically lose those that know instantly that they are not capable. Each individual needs to be able to feel confident that they are able to meet the goal. This is decided through identifying strengths, areas of growth and competency levels of the teachers.
- The message needs to be consistent for each member of the community, including administration (Tan, 2012; Fullan, 2011). If the administration does not take ownership and become part of the process, demonstrating to their colleagues that they are also learning while leading then the teachers will not feel that the administration can relate to their frustrations and emotions through the change (Darling Hammond, 2010).
- The goals should always connect back to the purpose of the change – improvement of student learning, student engagement and best chances for learning (Cochran-Smith & Lytle, 2009; Haste, 2009).
- In order to determine the success of the change model, there needs to be a measure of success. This measurement needs to be established by the members involved in the change including administration, teachers as well as students. This measure should be communicated to those within the community.

As part of a 21st century learning initiative within the district, I was assigned to a school in guiding them through the Transform process in enhancing one or more the identified

pedagogical shifts outlined (Transform, 2012). The school chose to enhance their Flex Time model, adapted from flexible learning environments (Alberta Education, 2009) and improve on how their staff was using the time as well as the experiences for the students. Flex had been intended to be sanctioned time where students were provided the opportunity to master particular skills, carve out time for passions and interests or engage in various activities focused on health and wellness. Unfortunately, within the high school environment, Flex Time had become into study hall and homework completion time, largely due to teachers making use of the blocks to catch students up on material from their regularly scheduled courses. Many of the teachers felt that Flex needed to change before its intention was been repetitively misused, eventually leading to its cancellation if these actions continued. In meeting with the teachers tasked with leading the Transform initiative, they had decided that an attempt to revamp Flex would be to build a week themed around a particular social issue where multiple selections for Flex would be offered with a final student compilation, demonstrated in a multimodal method by which the student chose, answering an overarching question. The greatest apprehension in beginning this project was the projected resistance from other staff members of the school who had been using the time in a way that was contradictive to its purpose. The lead teachers knew that staff had been expressing concerns over students lacking in several 21st century skills and competencies in general, as they had been observing throughout the year, however, movement had not been made to improve the opportunities students had to develop these skills in the first place. The lead teachers felt that many had lost the vision for what Flex was truly meant to be and that theme week would be a way to bring the community back together. The idea was there, however, knowing that without the collective agreement from all staff the project would encounter failure before it even began. The strategy was to revisit the goal and vision of Flex as a community.

With the lead teachers, we developed a series of focused dialogue questions, where during a staff retreat, members were given questions to answer individually, then discuss in smaller groups with the chance to share their thoughts. The questions were focused on the culture of the school and role Flex had in it. As teachers processed the questions and shared their personal views the dialogue reflected the true nature of what Flex was meant to be and staff had begun to realize that it was not reflective of it in its current state. The dialogue continued, examining the 21st century competencies, the issues of student choice in what they were learning and the means by which they were demonstrating their understanding. As the process continued, teachers began to find consensus in the fact that they needed to do something to restructure the way in which they delivered and offered Flex that promoted the development of the very issues they were addressing. Seeing the communal agreement of staff in the direction and goals they wished for the school culture, the leads presented the idea of the themed project week, which targeted every concern and strategy the teachers had addressed, with no reluctance. Project week became a huge success with the staff, students and parent community and became the starting point in regaining traction to a vision that was once lost.

Having experienced delivering change and change advice to several schools I have been able to identify a series of preliminary questions and pre-requisites that serve to establish the readiness, competency and risk level for teachers and administrators. From this initial stage, groupings of professional learning communities, combined with social networks to expand knowledge and experience to outside environments, are designed with appropriate supports arranged to facilitate and guide professional learning. Within this group stages of planning, action, reflection and revision, following a process of action-based research are conducted within a community of practice involving members of the school community. Stages of sharing and

collaboration within the context of the school community are essential for sustainability, therefore administrators as well as the educators in the school site must collectively establish a vision to move forward within the general vision of the district and provincial government.

Stage Three: Professional Development

Lemke's (2010) insights into professional development sustainability highlighted that improving student learning and development of desired competencies is heavily influenced by the experience of effective school environments. This in itself is accomplished by providing teachers the opportunities and time to develop their own strengths to be able to best support students and their needs which is not possible through short term training sessions as is often the case in educational professional development. Lemke (2010) identifies several school districts from around the world where professional development has become embedded into the culture of inquiry within the school and as one can imagine would take a vast amount of time to initiate, organize and carry out. With some of the schools studied, time has been incorporated into the timetable to accommodate for the development of best teaching practices. Within Edmonton Catholic School District, this crucial need had been recognized and has been honoured through weekly half day staff time for professional development to occur. It is through these sanctioned afternoons that many schools can dedicate time for professional learning communities or for staff to attend district run professional learning sessions held by the consultants from the department that I am part of. This technology integration plan intends to structure professional development during these times with targeted goals and individuals with common interests through sessions spanning the course of the school year. Engaging in the dialogue process begins to identify where the teachers see themselves in relation to providing 21st century learning opportunities for their students as well as where their colleagues are. In doing so, establishing a sense of belonging

to a group with common interests and expectations. This group, if facilitated appropriately, can serve as the momentum to achieving the change. As the professional learning communities gather, process, plan and implement 21st century strategies, ongoing dialogue and reflection of goals is necessary to ensure that their actions are reflective of the vision.

Once the goals and vision are in place, the means by which the change is approached will be dependent on what the members of the community will develop, the key is to provide the appropriate supports so that the change becomes sustained. This may take the format of the following situations:

- Building capacity amongst teachers to strengthen the skills and applications of various technologies comfortably and without reservations. (e.g. as teachers leverage the tools to foster 21st century learning, such as social media networks for developing global awareness, these practices can then be applied to other curricular areas. Teacher groups can select a strategy to focus on and together identify areas within their own curriculum where the strategy could be best applied and most relevant. Creating online blogs can be considered a format that encourages writing comprehension or as a form of persuasive writing for a variety of social viewpoints. Through a group teachers can develop action plans where the practice can be integrated through the use of a common tool to share in how that tool can support their desired practice and discover ways in which the tool can be applied further.)
- Solidifying relationships of trust and collegiality to create supports within the school community. (e.g. Through community professional learning teachers can identify individuals that offer insights on integrating technologies thus providing springboards into their own insights. As ideas and practices are shared and constructed through the group, relationships

that spur innovation and creativity are encouraged as bonds formed through common interests.)

- Building a community of learners through communities of practice focused on a particular instructional strategy so as to build resources and strategies for successful implementation by sharing in best practices. (e.g. Teams of teachers with a common goal to develop, share and integrate newly developed resources are given a purpose to test out their instructional designs so as to contribute to the group's progress.)
- Establishing external resources for teachers to reference. (e.g. reaching out to online professional learning sources providing tangible and relevant resources for successful implementation. In professional learning communities, teachers can find online resources to bring back for shared collaboration on instructional strategies relevant to the context of the community. By expanding the network out to global education resources, teachers can discover successful pedagogical practices that may serve as a target for the group.)
- Providing opportunities for appropriate inter and intra-school visitations. (e.g. visiting schools that practice 21st century learning models provides a contextual understanding of the necessary requirements and means to establishing similar practices in ones' own environment. Professional learning groups can then use their observations to reflect on how their own environments may need to adjust to promote desired learning.)
- Providing the environment for meaningful and relevant practice and experiences. (e.g. as student learning is strongest when experiences are relevant, so to must professional learning communities provide relevancy for optimal professional development. Groups structured around common goals and values offers teachers with these experiences that generalized professional development session lack.)

Determining the goal of the professional learning group should be dependent on the interests and needs of the participants, this could involve focusing on developing a 21st century competency from the ministerial order (Alberta Education, 2013b) or form of technology. In order to bring a common language and level of understanding to the group of participants, appropriate background and knowledge of the selected goals should be prepared as part of group research and exploration. These resources, whether case studies, lesson exemplars or research based studies into the particular set of strategies will provide teachers the understanding into the intention of the competency or technology, how it affects student learning and evidence into successful integration within similar situations. My role as facilitator would be to either provide participants with appropriate resources or guide them through searches in finding their own relevant materials. Much of the successful change experiences I have witnessed or facilitated has been through developing an understanding of the process and what the change will inevitably produce, which unfortunately has not been an opportunity for most teachers to experience if they have not seen or experienced the practices for themselves. Exploration into successful models of their desired challenges offers the ability to believe that what they intend to accomplish is possible.

As teachers gather necessary information as to what these models look like in other environments, they will then align the practices to their own curricular objectives, supporting their current structures with the intended goals. Those implementing the change need to be provided the opportunities to visualize the change successfully. Within the classroom, the change needs to be achievable, yet relevant to the environment. Selecting achievable, appropriate strategies for implementation will promote success as the process is not a complete shift from standard practices but an enhancement to what is already occurring. If the goal is to have

students think critically (Alberta Education, 2013b) possible strategies would be expanding students exposure to information they are typically provided, whether through online discoveries or through outside experts, which offers students the chance to disseminate the information to its integrity or accuracy. Easing teachers' comfort levels in achieving this particular competency would be best integrated into a current strategy so as to not overwhelm, creating an optimal environment for success. Much of change processes has to deal with replacing a current strategy with another; the latter having greater outcomes, not to add redundancy. The goal is to create a sense of success, which is often a mistake many schools make as their goals far exceed that which their staff is accustomed or capable of. Through the professional learning communities new strategies and practices will emerge as dialogue and sharing of ideas occurs with the discovery of new methods that may not have been known. Being surrounded by colleagues who are sharing similar experiences can lessen evident stresses as they are able to collaborate towards solutions and best practices rather than facing challenges alone.

Fullan (2011) expresses that during the change process, those involved need to be given the opportunity to celebrate the achievements throughout the implementation as it creates moments of success and meaningfulness to experience continued progress. Through the professional learning communities groups would reconvene regularly to share in their experiences, challenges and collectively develop solutions to problems they face throughout the journey. In knowing that others are going through the same situations they are, gives the ability to identify with similar situations. In a community of practice that I facilitated on the use of a digital resource that our district had purchased for all students the teachers in the group had challenged themselves to make greater use of the resources by replacing current practices with those involving the new tools. Through the course of implementation, several teachers had

experienced challenges with the tools as its functionality varied depending on the devices the students had at the different schools. By sharing in their struggles, others in the group were able to provide solutions to the problems faced thereby addressing much of the issues allowing the group to move forward as they now had strategies to take back to their sites. Without the outlet of the group to provide supports, majority of the teachers would have abandoned the tool and with it the benefit to the students.

Changing school culture through the lens of technology integration is much more than simply applying a practice or strategy in the classroom as much of where we came to learn our current methods and actions from are learned behaviour from our childhood experiences. Additionally a product of teacher education and the cultures within our schools. It requires creating new experiences and relevancy to an evolving system, models of thinking found in the ministerial order (Alberta Education, 2013b). As Fullan (2011) suggests tapping into the intrinsic motivation for long-term change happens when teachers are exposed and part of "experiences that turn out to be motivating because people find them emotionally meaningful relative to their values and their ability to fulfill them" (p. 56).

Stage Four: Sharing and Reflection.

If we learn about ourselves, our weaknesses, strengths and what we are capable of through our experiences, then the most ideal situation to improve and explore new strategies that are sustainable and effective is through practice and experience. Lecture based professional development does not provide the opportunities to generate an environment where educators can apply different practices and witness the results. Although many teachers do take practices that they discover from district run informational sessions or through online shared best practices, these teachers who practice out of the box thinking are often isolated within their own

classrooms. There is little opportunity to share their findings, strategies and their moments of revelation with others, quite often feel hesitant to share out of fear of exclusion or criticism from teachers who do not share their enthusiasm for innovative teaching. With many of the schools that I work with this is a major road block to the process of evolution and change within the culture of the school. I worked recently with a group of elementary teachers going through our district's change model for pedagogical practices, Transform, where the group of educators from varying grade levels developed a project-based learning opportunity for their students focusing on the theme of a community. Through the duration of the project data was collected as part of documenting the journey for both the teachers and as a formative assessment piece for students. At one of the weekly staff meetings, the administration encouraged these teachers to share their project with the rest of the staff members so that they were aware of what was occurring in the classrooms as there had been questions on what the classes were doing. In consultation with the Transform teachers, they expressed great concerns about sharing this information with the other teachers in fear of criticism and exclusion outside of the staff meetings and out of earshot of the supportive administration, which had been a common issue in the school. Although the project teachers were hesitant in presenting, their desire to reach out to the staff and encourage their participation and collaboration for future project-based activities was the necessary drive they needed to showcase the work completed. As they shared with the staff the structure of the project, the multitude of curricular outcomes and 21st century competencies that were targeted and successfully demonstrated from the project, the openness of the staff was highly evident. The presentation was delivered to the staff as an open invitation to work with the group towards future projects with the understanding that there had already been experience with implementing a project of that caliber and that any additional teachers that wish to contribute to its

improvement was welcomed. By the end of the presentation, dialogue had begun from the other staff members on how they could implement the project within their own classes knowing that they had the support and guidance from the Transform team.

Celebrating in the process and sharing in experiences aids professional learning communities in continually revisiting the goals and vision set forth for the change model. It provides the necessary reflection to ensure that change is moving in the intended direction and that participants are receiving the necessary supports for its continued progress. With each professional learning community, sharing is essential in understanding the pitfalls and the possibilities. By preparing resources and exemplars to share, those experiencing changes can reflect on the process and identify on achievements and what contributed to them as well as what part of the process did not work, critically analyzing what steps needed to be taken to improve upon it for the next step. In sharing and reflecting with colleagues working towards similar goals insights can be offered from their own experiences that may not have been realized before. Being part of a group working towards similar goals can create an atmosphere of trust and acceptance that everyone involved is experiencing the same hurdles and achievements as they are shared, diminishing the false pretense that one may feel more inadequate in their ability than another. As facilitator of the groups, my role would be to foster the safe environment by guiding conversation constructively and with non-judgement (Fullan, 2011). To facilitate this within a group can be challenging as initially the reluctance to contribute is often high, the key to understand the dynamics of the individuals within the group, evolving as the communities continuously gather. For some, developing the openness to contribute to the dialogue should begin by sharing in successes with non-verbal opportunities for feedback, participants sharing their plans for actions in a visual manner with structured feedback asking others to contribute

positive insights where the intended project could also be applied. Sharing in this nature reaffirms the originator of the strategy that their ideas could be applied in a variety of ways or modified in ways that had not been identified initially. Although there are many means to which open dialogue and sharing can occur in professional learning communities the goal is to create an open, non-judgemental atmosphere where participants have the support of colleagues in the same situation with the same intentions (Fullan, 2011).

Overview

Using the structure of the technology integration plan as outlined, school sites can begin to determine what technology is most appropriate for their school based on their focus and goals to foster 21st century learning as opposed to spending valuable resources on tools not used to their full potential. As teachers, along with their administrators, analyze the needs of their school, the future direction for their students, their own abilities and what supports are necessary for sustainability the capacity to embrace and utilize technology in an effective way can be achieved. Dialoguing provides the members of the school community with an understanding of their colleagues' strengths, areas of growth, struggles and what they value as educators. In understanding these elements, levels of tolerance and acceptance emerge that become the supports needed for communities to form and change to begin. As professional learning communities form around communally developed goals and vision for technological pedagogies the accomplishments made by the learning community will sustain positive change as the new learnings become the new normalcy. By utilizing this technology integration plan throughout my role as educational technology consultant in the district, it will provide the ability to make connections with the staff experiencing struggles of change and assist in preparing them effectively in building their capacity and understanding of how technology can create authentic

learning environments for their students. Determining the direction schools can take to reach their goals of improving learning through technology and 21st century practices will assist administrators in making appropriate decisions towards the best tools to support communication and collaboration for their students and staff. Through this process the culture of the school can evolve to encompass the learning objectives set out from the provincial ministry thus providing students the best possible chances in the world they live in and that of the future.

Chapter 4: Reflection of Masters in Education Program

When beginning this journey through the Masters of Education program, my view of educational models and understanding of its origins were largely based off my own experiences as well as my exposure to old texts and imagery or from what I had seen from Hollywood interpretations. As a child, schools were the places of learning, friendships and memories. Moving throughout the school system from student to educator, my understanding of education evolved as I now had a new perspective of what it was. I always thought that once my bachelor degree was completed I was finished, I had earned my dues and I was no longer the learner. I could have never been more wrong; my learning curve became steeper than ever. Teachers never stop learning. Every year there is a new crop of students, all with varying needs and abilities and since students do not fit into a specified mould guiding them effectively involves learning about them and adapting to their needs. Teaching assignments change. Every year I was given a new subject to teach, a new grade level meaning a completely new curriculum to learn. As much as I would like to think that I am an expert in the field of Science, each new grade level required continuous preparation as I attempted to develop robust activities targeting my wide range of learners. I would like to think that the rest of the teaching profession practices the same tenacity to find the most engaging and relevant lessons for their curriculum and yet in my experiences as

an educator and technology consultant, I come across several educators using the same resources from my time as a student. So much has changed in our world including the world of Science that antiquated content, means of delivery, engagement and student representation do a disservice to our students.

Through the Master's program I have been exposed to a variety of topics related to curriculum and instruction that have widened my opinions and understandings of how ideologies and curricular theories have shaped the educational landscape and pedagogical practices. Courses in leadership structures have enabled me to understand how educational and instructional leaders empower educators in making significant changes to the landscape and in pedagogical praxis. Studies in research methodologies have broadened my awareness of methods for data collection and analysis specifically in the field of qualitative research. Understanding the complexities behind these methods clarified that educational research is not simply constrained to numerical values when findings weigh heavily on personal values, beliefs, biases, interpretations and style.

Having a scientific background, my version of research involves methodical testing of variables through experimentation. Manipulating conditions and variables until the numbers are sound and not just once, over and over until satisfactory results are obtained. Every experimental research begins with theory that has been developed by scientists since the dawn of time, each discovery building upon towards greater understanding of the first. I have always believed that previous scientific research provided Science with the knowledge and the foundation to develop further theories and test the boundaries of that which we knew. In education, I failed to connect that our current pedagogical practices, as in Science, have been formed from centuries of observation and analysis of sound practices that have evolved through shifts in culture and society.

Much of this program has expanded my beliefs of research, how it is conducted and the degree to which others' thoughts, ideas and findings shape the educational landscape as we see it today. As I continue my educational career I have a new found appreciation for research as exploring the evidence of pedagogical practices, ideological beliefs and the foundations of education provides insights into new concepts and reaffirms my personal views. Whether I am teaching Science or assisting educators in building their technology integration capacity, research provides the foundation for my practices. If I'm doing something effective or ineffective, research will confirm it. If I need to know how to approach a student and their needs, research will guide me. If more advanced and effective pedagogical practices exist, research will provide them.

Prior to the program I was living in a bubble… education without religion was a foreign concept and I knew nothing of the how the rest of the world worked, what they valued and how that affected their educational programming. Examining the works of Dewey, Eisner, Bobbitt and other educational scholars allowed me to appreciate the theory behind what shaped learning environments both within and outside my own. Providing the ability to better understand the needs of the culture and the society for optimal sustainability in practices and movements aids in finding common ground with a school culture. It gave me a lens to view other models, understand the design of structures, why particular decisions are made, where the goals and vision of the school originated and how it affects their approach and acceptance to change.

As leaders in education our roles are more than simply delivering content and guiding students through their learning journey. It's a complex role that may include analyzing budgets, staffing placements and interactions, managing building maintenance, hiring and supporting staff in addition to ensuring that the students are receiving an education that falls within the scope of

the provincial government. With so many responsibilities it is challenging to fathom how one individual can keep a system in check and running smoothly. The key being that it simply cannot be one individual, that effective leadership in a school is achieved by leveraging the instructional and educational leadership of those within the community. It involves developing an understanding of the community of players, their needs and abilities, analyzing the processes at play and adjusting accordingly to keep a healthy balance for all; successful plate spinning seems easier by comparison. Although my role does not involve the complexity of a school administrator, I am still tasked with supporting and guiding change requiring a thorough understanding of all aspects of the school and its working parts. The leadership courses explored various areas of instructional leadership examining how learning styles of individuals aided or prevented their ability to adapt to new circumstances. An in depth looking into change models, specifically those described by Fullan provided the foundations for achieving sustainable change as it explored the multiple facets that exist in complex systems. By playing close attention to the behaviour and attitudes of those in the system, leaders can adjust accordingly to ensure transitions are achievable and sustainable. This course has laid the groundwork for where my role in the district needs to originate and has given me the necessary tools to monitor and adapt to others that I support.

Curriculum ideologies and theories, methods of research and instructional leadership have been the aspects that have impacted my journey and have direct relevancy to my role as educational technology support with the district. The knowledge gained delivers insights into how I can incorporate the foundational understanding into my service to education and the district as a whole. Throughout this journey my personal experiences into change culture by analyzing the environments I encounter through the lens of ideologies, leadership and research

models and assists me in adapting my methods. As I face new challenges I am able to draw from what I have learned about curriculum and its evolution, instruction and its foundations, leadership and its impact and develop a course of action that pulls from educational research so that my attempts to make positive improvements to education are not futile.

Where this becomes the greatest of assets is in my work with professional development. It is a structured, sanctioned time dedicated to the betterment in the professional career of an individual. Why do we engage in professional development? Often it is to change our practices and improve them to become the best version of ourselves and our chosen professions. To begin change, there needs to be an understanding of where we came from and how we got to where we are today. Learning from the mistakes and successes from the past, examining various models of leadership and interactions at play within a system and being aware of a wide range of educational structures aids me in establishing a proper course of action in supporting teachers. Taking this knowledge and applying it in my work with educators through their own growth and guiding them by examining the history of our profession; what works well and in what situations according to the research.

Often districts and schools engage in change models to reshape and enhance learning environments based on current societal practices so as to ensure that the citizens of the future are prepared to continue the progress previous generations have established. As innovation shifts society and its behaviours our school systems begin to find their place. Unfortunately the movement within schools for drastic change is slower than that of society as a whole, the resistance to the change is viewed as an internal conflict, such as fear and apprehension to one's own abilities, associated with external conflicts that arise when others experience greater achievements. Overcoming these hurdles requires combined efforts of administrators, teachers,

government and individuals in roles as my own to move education forward to meet the needs of students for a future yet unknown. The program provides the ability to examine educational structures and practices and apply strengths and successes to current situations as the research can indicate positive shifts and the conditions in which they were met, in hopes of replicating similar situations.

In determining the best possible course of action for professional development, in regards to technology integration, requires learning about the environment in which the technology will support. This involves awareness of the individuals within the environment tasked with instituting these changes, their strengths, areas of growth and the processes that best suit the conditions. Having explored the various complexities of education; curriculum, ideologies, methodologies, epistemologies, and levels of instructional leadership aids in painting a picture of the current state of schools and their practices. Being cognizant of how schools operate based off of this criteria assists me in exploring solutions through the knowledge I have gained through the master's program.

Technology integration has more to do with the practices than the tools. Successful integration plans occur when schools look past the tools and understand what needs the tool will fill within the context of their environments. Technology advances the means by which we collaborate and communicate, it enables us to explore in-depth concepts drawing from information accessible through real-time, authentic learning. Through technology, students are able to process data and resources while simultaneously collaborating with peers and experts from around the world to formulate solutions to complex, higher order problems. As technology evolves and widens the scope to which we can reach out for relevant information the key concepts and competencies are what is to be considered the sustainable practices that we are to

foster in our students. It is the pedagogical practices in creating an environment of inquiry and collaboration that needs to be researched when preparing schools for 21st century learning so that the technology becomes a tool that supports the learning rather than a hurdle for educators to overcome. As teachers begin to unveil the potential that technology can unleash for students to go beyond lower order processing skills to invoke creativity and innovation, the challenges to incorporate these tools into the classroom becomes secondary.

As we learn that our students have multiple needs, multiple styles of learning and multiple means of communicating comprehension, our educators must be treated with the same notion. Creating professional development to enhance 21st century skills within our teachers is simply not achievable with traditional means. As teachers we guide our students and develop their abilities, building upon that which was learned previously. Professional development needs to be tailored to match the similar philosophies that we practice in the classroom; active and authentic learning. Teachers need to be given the opportunity to experience new strategies, the time to develop their skills and the guidance from colleagues and mentor teachers so as to build capacity within themselves. Throughout the world innovative teaching occurs and through the exploration of these practices, teachers can being to visualize these models within their own pedagogical practices. Building this capacity requires that the research is present to support these shifts. Sharing best practices through action based research can provide teachers the opportunity to reflect and distribute their knowledge and findings, solidify and communicate their successes and provide the structure for others to follow suit. Having teachers at the forefront of change, exploring the research that can scaffold their development and providing them the outlet to contribute to the positive shifts in technology integration paves the way for forward movement.

The key to changing school culture is creating a supporting environment so that all members of the community move forward collaboratively to build capacity and sustainability of best practices. There is much apprehension with technology integration that often hinders progress for a school community in both internal and external barriers. Venturing into a situation of great change that challenges educators to adjust their values and beliefs of sound pedagogy requires paying attention to the needs and emotions of all. By doing so school leaders and change innovators will be able to identify the needs of their colleagues, discover strengths or passions in those that can be leveraged to provide the necessary supports for team members who require additional guidance. Change is a tough process and through experience, is not always the easiest to accomplish alone. Even those educators that are naturally innovative, which find new ways to enhance the learning for their students, often have no outlet to share their successes if their direct community of colleagues does not share in their enthusiasm. They face fear, judgement and criticism. Majority of the time, not for fear of their own inadequacies but to the introduction of pressure and criticisms from colleagues that question deviation from practices are not fluid throughout the school. To overcome this barrier is often to the credit of the individual's personality, not allowing another's opinions and judgements to slow progress or successes. In other situations, an atmosphere of acceptance and free from scrutiny is all that is needed for innovative practices to flourish. Strategizing using change models that Fullan outlines assists school leaders in honouring the stages of the process, including periods of turmoil, being aware that the end goal will be met with resistance, struggle and feelings of defeat. Rather than halting progress due to these implementation dips, steps need to be taken to create an environment that nurtures positive relationships, removes teachers from isolation, increases capacity of capabilities and urges the quest for improvement.

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Appendix

Questions for Dialogue Stage of the Technology Integration Plan

Evaluating School Culture

Current school practices

- Is technology integration for the procurement of 21st century learning competencies in students practiced on a regular basis?
    i. If so, identify which specific technologies is integrated and provide examples, if applicable, of situations where this has been evident.
    ii. If not, what roadblocks are there that prevent the use of technologies to foster 21st century learning?
        a. Personal experience and/or knowledge of options
        b. Infrastructure
            i. Bandwidth access and stability
            ii. Hardware/software access
            iii. Troubleshooting supports
        c. Lack of support and resources
        d. Attitudes and beliefs of the school culture and staff members
        e. Professional development
    iii. If any of the above are a consideration, which areas would be most beneficial to you for increasing your capacity in integration of technologies to support 21st century learning?

Current school vision; including professional growth plans and school growth plans

- Is technology for supporting and achieving 21st century learning embedded within the goals of the school and each individual teacher?
- Is there incorporation of technology to support 21st century learning in the goals, vision or plan in the: (if so, identify briefly what they are):
    1. District Goals
    2. School Growth Plan
    3. Personal Growth Plan

Current teacher technology knowledge and competency

1. What types of technology are currently used?
    i. List the technologies used on a daily basis.
    ii. What technologies are the students directly using?
    iii. Are students choosing what technologies they are using? For example, choice in website, presentation output, assignment format.
2. How often is technology used?
    i. Is technology used daily by students? During a specified block? Freely throughout the day?
3. For what intention is technology used?
    i. Research
    ii. Presentations
    iii. Skills practice

iv. Demonstrating higher order thinking skills such as; analyzing, evaluating, creating
v. Free time use

Current school demographic including academic and technology knowledge, including inclusive students and their needs

1. Is technology access an issue for the students at school? At home?
2. What is the access to technology within the schools? Lab based? Laptops? Mobile Devices? Bring your own Device?
3. What forms of 21st century communications are students currently utilizing in and out of the school?
    i. Text messaging
    ii. Social media sites (Tumblr, Facebook, Instagram)
    iii. Online gaming
    iv. Video chat (Facetime, Skype)
    v. Online discussion forums
4. What 21st century competencies can your students identify and have demonstrated strengths or areas of growth in?

Discussion on the expectations of the mission for Alberta Education

1. Are teachers aware of what the goals of Alberta Education are?
    i. What do the 3E's listed in Alberta Education's ministerial order reference?
    ii. For each of the 3E's, please lists examples of where your students demonstrate these competencies

1. Ethical citizen
2. Engaged thinker
3. Entrepreneurial spirit

2. Alberta Education has developed a set of cross-curricular competencies that are the vehicle to achieving the 3E's desired in a future, educated Albertan:
    i. Which of the cross-curricular competencies are most evident in your students?
    ii. Please highlight three of the cross-curricular competencies and how they are demonstrated in your students
    iii. What competencies do you feel your students need to develop more?

Can teachers identify pedagogical practices that foster development of 21st century competencies?