AN INVESTIGATION INTO THE FEASIBILITY OF DELIVERING ONLINE EDUCATION TO REMOTE COMMUNITIES IN CANADA

CASE LOCATION: YUKON

by

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ABSTRACT

Canada continues to be among the world's most 'wired' countries. Life in urban Canada is fueled by high-speed wireless connectivity, shifting brick-and-mortar services to cyberspace including banking, shopping and socializing. However, rural Canada is still catching-up on such technological advancement as a result of little investment in the digital infrastructure by the telecommunications sector to elude lower ROI, causing a Digital Divide. This Digital Divide poses an opportunity to be bridged by bringing rural Canada to cyberspace and giving them an equal opportunity to thrive.

As cloud technology has disrupted many key sectors including business and social exchange; the Education sector still has not been able to fully utilize the massive opportunity cloud offers as a valuable platform for delivering education to remote Canada. My MRP focuses on the feasibility of delivering online education through the effective use of cloud technology in Canada's key northwestern area called Yukon.

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Introduction

At the turn of the 21st century, many new ways of voluntary digital collaboration were noticed evolving across the globe. These collaborative efforts directly enhanced the means to exchange ideas, conduct business, network through social media, deliver education, share news and broadcast live events in a more time efficient and effective manner than were possible before the digital revolution.

In the realm of online education, a global academic revolution, known as Khan Academy, regarded as the start of future schooling system by Bill Gates, surfaced on the internet just a few years ago, opening up doors and opportunities for many other ideas. Additionally, Coursera and MOOC (Massive Online Open Courses) have been successfully utilizing the digital means as an enabler to enhance learning and collaboration by bridging the inherent gaps of the brick-and-mortar education delivery systems especially for higher levels.

However, generally speaking, none of these technology providers have so far joined hands to lay an infrastructure of a complete online schooling system to deliver structured education that could be replaced by the brick and mortar education delivery system. At the most, a "blended" version of education has been evolving since the birth of digital revolution, cloud computing and mobile social interactivity. This blended version allows a student to use both face-to-face classroom methods in combination with computer-mediated activities while still attending a "brick-and-mortar" school structure. As per Clayton Christensen Institute, Blended learning is partly defined as a "i) formal education program in which a student learns at least in part through delivery of content and instruction via digital and online media with some element of student control over time, place, path, or pace and ii) at least in part in a supervised brick-and-mortar location away

from home"[1]. The terms "blended," "hybrid," "technology-mediated instruction," "web-enhanced instruction," and "mixed-mode instruction" are often used interchangeably in research literature; however, there's a slight difference between the blended and hybrid models that will be discussed further along in the paper.

Generally speaking, such speed of rapid change has found education boards overwhelmed to find the right balance in their schools and keep pace with the fast evolving technology and the resulting habits of students when it comes to learning, attaining knowledge, accessing, consuming and disseminating information.

The Knowledge Economy in Evolution:

The Knowledge Economy is transforming the ways today's students or Digital Citizens understand, perceive and approach a problem to find relevant solutions. This puts the educators, boards and the teachers in the spotlight to explore new ways of teaching these tech-smart students. For that matter, a quick check needs to be run on teachers' current skill sets to be compatible with the learning behaviors of students. This also calls for investment in upgrading the Digital Literacy levels for teachers and parents to keep pace with the digital revolution and to provide the required infrastructure for a smooth transition.

A Generation Digitally Disrupted:

The parallel Digital World that surrounds students today with its many opportunities and challenges is in the process of disrupting the very Education industry. The next decade is going

[1] http://www.christenseninstitute.org/blended-learning-definitions-and-models/

to be instrumental in witnessing the big change in the Education sector. Currently, we are still gaining a deeper understanding of the "habits and usage" of the Millennial generation that defines the very hybrid world we exist in; however, with generations emerging post the Millennial and the Generation Z, it is easier to determine that the dominant world is going to be the Digital World. Today's rising "blended" education system will easily be merging into the next level of mainstream digital delivery of education. This can ideally lead to a more streamlined "pace" and "location optional" learning with potentially standardized technology for the delivery of education in both rural and urban centers.

Currently, however, there exists a wide digital divide in rural and urban centers that clearly causes a barrier for the Millennial and Generation Z of rural Canada to be as digitally literate and savvy as their counterparts in urban Canada. It is indeed alarming to even think what future holds for the rural Millennial and post Millennial generations of remote Canada, as the playing fields are not the same for them, they are facing more challenges to survive than opportunities to thrive.

Therefore, my MRP will focus on the feasibility of delivering online education through an effective and efficient use of cloud technology in a key northwestern area of Canada known as the Yukon. My motivation is to find ways to build an effective online delivery of education, minimizing the national digital divide leading to widespread learning opportunities and new levels of student, teacher and parent collaboration. Also, on a secondary level, this study may help other key stakeholders involved in the digital revolution, in achieving the overall model success, increased digital literacy, ROI, student skills and motivation in the Yukon or other areas with somewhat similar challenges.

MRP Objectives:

1. To evaluate the feasibility of delivering education via digital means or online schooling system as "Smart Schools" in remote communities with a special focus on Yukon Canada.
2. To understand the effectiveness of "Smart Schools" in Aboriginal student learning, motivation and collaboration in comparison to the brick and mortar schooling in the Yukon by exploring alternative platforms for consultation and teaching.
3. To use this model MRP to spread affordable, convenient and globally collaborative education in the future through the concept of Smart Schools in the underprivileged and politically challenged countries.

MRP's Scope and Concerns:

As generally observed, such paradigm shifts disrupt many related industries, which may pose economic and societal challenges. Besides, this shift also raises many important questions that may need immediate solutions. These concerns may include understanding the way people behave towards embracing the change through technology; and how this change affects the way they learn, do business and earn a living.

On the other hand, improving the country's current technological infrastructure, making it affordable and accessible, supplying glitch-free and affordable utilities (such as electricity and fast internet connectivity), arranging for technology transfers, finding funds and project partners are also some of the main concerns that call for attention.

Moreover, such disruptions usually open up new job opportunities, new industries and ability to learn new skills by the people most prone to be affected by the disruption. There may be a need to minimize the job loss and/or industry obsolescence and replace it with new opportunities and new skills to accommodate the same teachers.

However, all such concerns as mentioned above, besides Yukon's current socio-economic challenges and other related issues that may be highlighted as part of the research are not in the scope of this paper to be represented with solutions. Furthermore, certain parts of this paper may represent gaps that may be discussed with a point of view of a suggested solution or alternative practice(s) for the sake of research based discussions. The focus of the paper is to only study the feasibility of the Smart Schools in the Yukon area and the solution will be based solely on this focus.

MRP Methodology:

The research was based on finding available resources and/or prevalent models in different parts of the world that may have been started for the same or different reasons.

It focused on research through the use of Internet; publications and blogs by industry leaders, technology companies and futurists; federal and provincial government websites for various departments; and available papers and articles written about public schools and education in the Yukon, digital literacy, digital divide, technology, cloud, Northwestern Territories (NWT), aboriginals, first nations, digital citizenship and other relevant subjects on a primary level.

Review of Related Literature:

The literature in review is a combination of scholarly publications, journals, papers, articles, books and blogs available through both Internet and physical libraries. These may also include videos of presentations, news or talks from various relevant speakers or industry leaders in the same realm, keeping the research objectives in mind. Besides, CanLearn Canada was also one of the beginning resources and reference points in order to understand the concept of Education in Canada in terms of delivery systems, classifications and learning patterns.

Understanding the Yukon's Current Public School and Education Landscape:

The guiding principle for the research and the literature review was to understand the problems and hindrances in education delivery systems in parts of the Yukon, Canada, where delivery of education is hindered by many socio-economic, cultural, technological, and administrative challenges. These challenges may include teaching systems, lack of specialized teachers, harsh weather, school budgets and facilities available to students; thus, contributing directly or indirectly to lack of student motivation towards education, lack of teacher-student connect, absenteeism and other learning issues.

While searching for the geographical areas, especially in northwestern Canada, to base my major research paper (MRP) with similar challenges as discussed in the previous paragraph, I was able to pinpoint the Yukon as the focus of my MRP. This may also serve as a test market for the idea implementation or the pilot project keeping the region specific challenges in view. The idea can

further be tailored to meet specific market conditions, segments and challenges to be implemented anywhere within Canada or abroad, especially in countries that are facing major political unrest or cultural barriers towards providing safe and gender-bias free education.

The research was initiated by exploring the Canada Statistics, Education Canada and Yukon Government web pages to get a bird's eye view on general facts about the Yukon including the history, population, geography, weather, trade, economic indicators, people, government, number of public schools and education sector in general.

To understand the specific challenges and issues in the Education sector of northwestern Canada, I came across a publication titled Yukon's Public School Education System, A 360-degree Perspective. It is a research paper written by a freelance political writer Yule Schmidt for Action Canada, Yukon Conference, held in Sept 2014. It discusses the key issues, gaps and challenges in the Yukon's current schooling and education delivery system with latest statistics and facts. This paper has helped me gain an insight into the problems within Yukon's education delivery system in the brick-and-mortar world and enabled me to lay a foundation of the "Problem Statement" on which my MRP and its solution are going to be based.

Also, in the first part of my MRP, the (Schmidt, Y. 2014) paper helped me build a case based on the author's research findings and data analysis, helping me spot areas of opportunity for proposing an online education delivery system as a case study for Yukon's K-12 students. It helped me understand areas including the differences in the education delivery in urban and rural Yukon, the Yukon's education department's vision, mandate and strategic goals with special focus on the 21st century technology learner, the following of BC's curriculum, aboriginal peoples' voice in the curriculum, current state of education in the Yukon and the various

challenges faced by the students of rural Yukon. These challenges arise from social, cultural, psychological, administrative, and in some cases health issues. Besides, there's a heavy baggage of the horrifying experiences of residential schools from the past, carried over from the previous aboriginal generations to the current ones. These experiences impact the rate of progress at which the current generation is moving towards getting education in general.

Understanding Digital Literacy and Digital Citizenship Frameworks in Canada:

The second or the middle part of my MRP deals with the digital divide and the digital literacy levels in Canada, with a focus on the Yukon. To understand it better, I took help from the study by Media Smarts, (Canada's centre for digital and media literacy) through their paper called " Mapping Digital Literacy, Policy and Practice in the Canadian Education Landscape", written for Media Smarts, by Michael Hoechsmann and Helen DeWaard, Lakehead University. This study helped me understand the overall digital literacy landscape with various definitions and standards of digital literacy in different parts of Canada as well as how digital technology is being used as a means in our education sector. It describes various models of digital literacy, including a combination of digital and physical worlds while progressing towards the future of a more globally collaborative and location independent online schooling system. Furthermore, how these models will evolve the role of teachers and parents (with that of the students') will also be touched upon in my MRP based on my learning.

Digital Divide in Canada and the Telecommunication Infrastructure in the Yukon:

Also, I drew from the study by economic development, government of Yukon called Yukon Telecommunications Development, Final Report, Dec. 2012, prepared by Lemay-Yates Associates Inc. to understand the telecommunication sector's role in providing the digital

infrastructure or digital backbone in Yukon in order to turn the digital/online school's dream into a reality. Right now, one of Bell's brands called Northwestel is providing broadband services in the Yukon area; however, as per the study and Canadian Radio-television and Telecommunications Commission (CRTC)'s references, the service speed is inefficient and costs higher than that of southern counterparts. It certainly broadens the digital divide between the north and the south, putting the latter at a clear advantage. This poses an opportunity to bridge the gap and provide an equal footing to northern areas to pave way for delivering education through digital means.

Available Disruptive Education Models, Online Learning and Trends:

Keeping in tune with the MRP objectives and focusing on the roles and relationships among the students, teachers and parents, the last part of the paper will investigate the digital capabilities enhanced by cloud computing, making distant, collaborative and timely delivery of education a possibility. The primary focus will be elementary and high schools, keeping the K-12 grades classification in mind. As per a paper by Deloitte University Press, called Digital Education 2.0:From content to connections in Deloitte review issue 16, my MRP touches upon on the integrated next-generation technologies that may equip students to continue their education in various phases of their lives while fortifying student skills, increasing education's ROI and becoming innovative and entrepreneurial. As the research suggests the education providers will have to shift their focus from content to connections, keeping in mind the broader vision of social change within the broader context of social, political, economic and climatic conditions.

Further the MRP will also shed light upon the essential elements of digital literacy, coupled with articles including the one in Maclean's by John Geddes, published on 2nd June 2015 titled: The

new program that has first nations' reading scores soaring, in order to understand learning models and behaviors in aboriginal communities from the findings.

I also gained a basic understanding through already successful non-profit business models such as Khan Academy that has created a whole new online world of collaboration and learning. It became a place where students all across the globe collaborate with each other online by engaging themselves into active learning and teaching activities. Also, there are similar models available to gain insights and analyze other successful online ventures including Coursera, which is, on the contrary, an open system of delivering education such as Massive Open Online Courses (MOOC). Although MOOC is not the focus of my research as it may offer a more distributed knowledge base on the Internet; however, it does provide some interesting and breakthrough insights in understanding the pros and cons of venturing into something more structured and controlled for online education delivery system as the focus of my MRP.

About Yukon

History:

The Yukon was the first area in Canada to be settled by people. The Hudson's Bay Company first used the name Yukon in 1846. They named it "Yucon," from the Loucheux Indian word "Yuchoo," meaning the greatest river. Historically, the Yukon is associated with the great Klondike Gold Rush. In 1898, the Canadian government officially established the Yukon Territory. That year, in one month, Dawson grew into the largest Canadian city west of Winnipeg, developing a complete range of services including water, sewerage, electricity and telephones[2]. At its peak, the population has been estimated at 40,000[3].

With the decline in gold the population decreased significantly and the economy shifted from gold to other minerals (including silver and lead) and fur in the absence of any other industry. Yukon's capital was transferred from Dawson to Whitehorse in 1953.

Yukon Indians live side by side with non-native residents in every community and form the majority of the population in more remote villages[4].

Population:

Yukon's total population is 36,667 as of June 2014[5]. Over 75% of Yukon's population lives in its capital Whitehorse with a population of 27,962 in June 2014[6].

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[2] EducationCanada.com - Careers and Teaching Jobs. (n.d.). Retrieved from http://www.educationcanada.com/facts/index.phtml?sid=yk&a=1&lang=eng

[3] ibid, 3

[4] ibid, 3

[5] Executive Council Office. (2014, June 1). Retrieved July 19, 2015, from http://www.eco.gov.yk.ca/stats/pdf/populationJun_2014.pdf

[6] ibida,6

Some other communities with respective population are Dawson City (1,998); Watson Lake (1,456); Haines Junction (840); Mayo (490); Carmacks (521); Carcross (436) estimated as of December 2013[7].

In June 2013 the First Nations population (self-reported) in Yukon was estimated at 7,651, which is 20.9% representation of the total population of Yukon[8].

There are fourteen First Nations, speaking eight different languages. Yukon has a strong and active Francophone community. The entire area became known as the Northwest Territories.

Economy[9]:

Mining, the Yukon's largest industry, accounts for more than 30 percent of the economy. Tourism also provides a base for jobs and services. Efforts have recently been made to promote other sectors, such as the forest industry. The fur trade is important for about 3 percent of the population, mainly Aboriginals. A small fishing industry operates in Dawson City to export salmon, and other commercial fisheries supply to local consumers.

Agriculture, expensive by North American standards, is a small but expanding industry. Although growth of the agricultural industry is limited by climate and the availability of productive land new research programs hold promise for the future.

[7] (n.d.). Retrieved August 31, 2015, from http://www.eco.gov.yk.ca/stats/pdf/populationDec_2013.pdf

[8] (n.d.). Retrieved August 31, 2015, from http://www.eco.gov.yk.ca/stats/pdf/populationDec_2013.pdf

[9] EducationCanada.com - Careers and Teaching Jobs. (n.d.). Retrieved from http://www.educationcanada.com/facts/index.phtml?sid=yk&a=1&lang=eng

Industry and Resources[10]**:**

Mining accounts for more than 30% of the economy, mainly gold, zinc, silver and lead with underdeveloped deposits of iron ore, copper, nickel and coal. Tourism, the second largest industry, provides many jobs. People come to hike, raft, camp, rock climb, fish, see the wildlife and to hunt. Beaver, lynx, wolf, wolverine, muskrat, marten, mink, otter, weasel and fox are trapped and the furs are sold.

Location[11]**:**

Located in the northwest, it is the smallest of the three territories in Canada. The perimeters of this mountainous territory form a rough triangle bordered on the south by British Columbia, on the west by the U.S. state of Alaska and on the east by the Northwest Territories and on the north by Beaufort Sea (Arctic Ocean).

Climate:[12]

Above the Arctic Circle (latitude 66^{o} north), the Yukon is known as "the land of the midnight sun" because for three months in summer, sunlight is almost continuous. In winter, however, darkness sets in and the light of day is not seen for a quarter of the year.

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[10] EducationCanada.com - Careers and Teaching Jobs. (n.d.). Retrieved from http://www.educationcanada.com/facts/index.phtml?sid=yk&a=1&lang=eng

[11] ibid, 11

[12] ibid, 11

The Yukon has a subarctic climate. The high altitude of much of the territory and the semi-arid climate provide relatively warm summers with temperatures frequently reaching 25°C or more during the long summer days. In winter the temperature ranges between +4°C and -51°C in the south and slightly colder farther north. Temperatures in the Yukon are usually more extreme than those experienced in the southern provinces of Canada, for example the average temperature in Whitehorse in January is -18.7°C. The average in July is 14.0°C with the lowest ever recorded -52.2°C, and the highest 34.4°C. The territorial low was -62.2°C and the high was 36.1°C.

Time Zone[13]:

The Yukon shares the Pacific Time Zone with British Columbia.

Transportation[14]:

There are 4 main highways connecting major parts of the area. These are Alaska Highway, Klondike Highway, Robert Campbell Highway and Dempster Highway. Several trucking companies operate in Yukon. Greyhound Canada provides bus service along the Alaska Highway. There are also several airports.

Government[15]:

The Yukon Legislative Assembly currently consists of 19 elected members and functions in much the same way as a provincial legislature[16].

[13] ibid, 11
[14] ibid, 11
[15] ibid, 11

As a territory, the Yukon does not have full provincial status, although it achieved a style of government similar to that of the provinces in 1979. The Canadian government retains administrative control over water, land and forestry and the development of all non-renewable resources (i.e. minerals, oil and gas).

In addition to their land claim settlements, the four First Nations also negotiated self-government agreements that give them more control over land use on settlement lands and greater authority in areas such as language, health care, social services and education.

[16] Executive Council Office. (n.d.). Retrieved July 26, 2015, from http://www.eco.gov.yk.ca/stats/1467.html#Vital

Table-1.0:

Quick Facts - YUKON	
Capital	Whitehorse
Total Population, June 2014[17] Urban population June 2014 Urban population June 2014-% First Nations total population June 2013[18] First Nations total population June 2013-%	36,667 27,962 76% 7,651 20.9%
Members of the Legislative Assembly[19] Members of Parliament Senators	19 1 1
Average weekly earnings, 2014[20]	$1,036.48
Real GDP 2013[21]	$2,283
Median Income 2013[22]	$43,110
Employment rate June 2015[23] Unemployment rate June 2015[24]	67.6% 8.3%
Per capita health expenditures[25] 2013	$9,979
Number of Jobs, Educational Service 2014[26]	1,399
Land area out of Canada's total area	4.8%

[17] Executive Council Office. (2014, June 1). Retrieved July 19, 2015, from http://www.eco.gov.yk.ca/stats/pdf/populationJun_2014.pdf

[18] ibid 18

[19] Executive Council Office. (n.d.). Retrieved July 26, 2015, from http://www.eco.gov.yk.ca/stats/1467.html#Vital

[20] Executive Council Office. (n.d.). Retrieved July 28, 2015, from http://www.eco.gov.yk.ca/stats/1469.html

[21] Executive Council Office. (n.d.). Retrieved July 28, 2015, from http://www.eco.gov.yk.ca/stats/1469.html

[22] Executive Council Office. (n.d.). Retrieved July 28, 2015.

[23] Yukon Employment June 2015. (2015, June 1). Retrieved July 27, 2015, from http://www.eco.gov.yk.ca/stats/pdf/employment_jun15.pdf

[24] ibid, 24

[25] (2013). Retrieved July 24, 2015, from https://secure.cihi.ca/free_products/NHEXTrendsReport_EN.pdf

[26] http://www.eco.gov.yk.ca/stats/1469.html

The Yukon Digitally Disrupted?

The Problem:

On one hand, the youth of the Yukon Territories is stumbling upon many societal blocks that are affecting their ability to learn and get quality education in the brick–and-mortar schools. These challenges comprise of social, economic, academic and personal such as student and teacher disconnect, higher rates of drug and alcohol consumption, income pressures, limited employable skills for the modern economy, and importantly a lingering past of horrific residential schools experienced by their fathers or forefathers. On the other hand, the growing focus on digital advancement with a 100% internet penetration in urban Canada,[27] out of the total 97% national penetration,[28] rural Canada still lags behind somewhere in the digital divide. Although, at 87% Internet penetration[29] in 2012 as per CIRA, rural Canada, especially the Yukon territories, still suffers with the lowest Internet speeds at the highest per GB prices in all of Canada[30]. This puts the millennial and post millennial generations of rural Canada at a disadvantage, as compared to their counterparts in the city, by limiting their prospects of personal growth, self-expression and learning, questioning the relevance of their abilities in the 21st century's digital economy.

The Gap:

Insufficient investment in the digital infrastructure and distant learning programs with low Internet speed and higher per GB pricing have created a visible digital divide in the Yukon.

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[27] The Canadian internet. (n.d.). Retrieved July 26, 2015, from http://www.cira.ca/factbook/2014/the-canadian-internet.html CIRA Fact Book 2014

[28] ibid, 28
[29] ibid, 28
[30] ibid, 28

Moreover, according to a recent survey of high school students by the Education Department of Yukon, majority students responded that the public schools prepared them "somewhat well" for further education. They also feel a great need to have received the employable skills in-line with the modern economy. These issues are pushing Yukoners behind, especially the ones in higher grades of K-12 in rural areas. This gap may likely cause them to lose their relevance in today's fast moving digital world as a contributing part of the Canadian society.

The Opportunity:

There's an opportunity to initiate efforts to bridge the expanding divides, be it digital or modern employable skills, and pave the way for the Yukon's current and next generations to equip themselves with the employable skills of the 21st century, initially through the education sector, and become a contributing part of Canada's economy.

Yukon's Current Education Delivery System

Yukon's Department of Education[31]:

In the Yukon, the administration of the public school education system is the responsibility of the Yukon Government, Department of Education.

The Department of Education is further divided into three separate Branches:

i) Public Schools Branch (Focus of my MRP)

ii) Advanced Education

iii) Education Support Services.

The Public Schools Branch manages 28 Yukon schools. This includes 14 urban schools (i.e. schools in Whitehorse) and 14 rural schools.[32] (See Table in Appendix A.)

About 30%-33% of the Yukon's total students are of First Nations ancestry[33]. Mostly, the language of instruction is English, followed by French and Aboriginal languages as second languages of instructions. In Whitehorse, French First Language and French Immersion education is also offered[34]. The Yukon is a full partner in the Western and Northern Canadian Protocol (WNCP); this protocol supports the development of common curriculum frameworks for Western and Northern Canada[35].

The main piece of legislation governing the Department's responsibility for education is the Yukon Education Act (Appendix B), passed in 1990 and amended in 2002[36].

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[31] Schmidt, Y. (2014). *Yukon's Public School Education System, A 360° Perspective*. Retrieved June 1, 2015, from www.actioncanada.ca
[32] "Yukon Schools." August 13, 2015. Accessed August 20, 2015. http://www.yesnet.yk.ca/
[33] "Yukon Schools." August 13, 2015. Accessed August 20, 2015. http://www.yesnet.yk.ca/
[34] ibid, 33, 34
[35] ibid, 34
[36] Schmidt, Y. (2014). *Yukon's Public School Education System, A 360° Perspective*. Retrieved June 1, 2015, from www.actioncanada.ca

Currently, Yukon's education system is based on the British Columbia curriculum, although as stipulated in the Act, 20% of the annual 950 hours of instructional time can be made up of local content[37].

Through the Act, the Department is responsible to the Minister, the parents, and the students. In addition, the Department liaises with various groups and organizations to inform its activities. These include, Yukon First Nations, the Yukon Francophone community, and the Yukon Teachers Association[38].

The Department of Education's Vision[39], Mandate and Strategic Goals:

"Our vision is for all Yukoners to possess: a desire for and appreciation of lifelong learning; a strong commitment to their communities; and the knowledge and skills needed to live meaningful, productive and rewarding lives".

Although, the Education Department's vision specifies three important areas of the Yukon students' lives including "lifelong learning" and "commitment to their communities" which are progressive parts of every region's growth "within" its own boundaries. However, when it mentions "the knowledge and skills needed to live meaningful, productive and rewarding lives", it could have also added the words " in the modern economy" to create a link between the world outside Yukon and the aspirations of those young Yukoners who have their hopes tied with the current school system to gain useful education and employable skills that can help them smoothly integrate into the modern economy of a developed country, i.e. Canada.

[37] ibid, 37
[38] ibid, 37
[39] (n.d.). Retrieved July 10, 2015, from http://www.education.gov.yk.ca/pdf/Yukon_Education_Strategic_Plan_2014-2019.pdf

One of the points in the Education Mandate of Yukon (see Appendix B) is to be *"working in co-operation with parents to develop the intellectual, physical, social, emotional, cultural, and aesthetic potential of learners so they may become productive, responsive and self-reliant members of society"* ties in well with empowering students and parents by bringing them up to speed with digital literacy and the required tools necessary for the digital citizenship and digital education. Besides, this may also stress the importance of building a relationship between the students and their parents that fosters positive thinking and a constructive attitude when it comes to looking forward at the future and together creating opportunities for themselves; rather than focusing on the past, such as of the residential schools, and passing the pain of that experience on to the next generations.

It is also interesting to note that "modern learning through the use of 21st century technology" has very little focus in the overall strategic goals for 2014-19 of Yukon's Education Department. It is only discussed as a part of a sub-point in the strategic goal no.1in the document and has only been given a very general introduction in the document (see Appendix C: New Technologies and the 21st Century Learner). In this digital age, especially when the technology can open access to a plethora of learning options and can be available at a considerably reasonable price without the need of extra physical space to set-up gigantic machinery or source expensive expertise to learn from, it was important that a special thought would have been given to it with some focused long term objectives.

These strategic goals are written to last till 2019, by which time the digital technology is expected to further improve and disrupt, especially the education industry of urban Canada.

According to Schmidt, Y., (2014), "the 2009 Report on Yukon Public Schools and Advanced Education by the Auditor General of Canada precipitated the (Education) Department's development of a long-range strategic plan to underscore its goals and objectives. The rather critical report noted, with regard to strategic planning, "...not all of the objectives in the Department's various key planning documents agree". Furthermore, in its Annual Report, the Department (of Education) does not report on how well the objectives from previous reports were achieved."

Schmidt, Y., (2014) further states that the report concluded: "While the Department of Education has elements of a strategic plan in various documents, taken as a whole, the Department (of Education) does not have a comprehensive long-term strategic plan." Schmidt, Y., (2014), also notes," Since the report, the Department (of Education) has been diligent in maintaining an updated strategic plan".

Linking the Present with the Future:

There is a growing need to blur the strong lines, if not clear them, between the traditional and the modern systems of education by initiating a gradual transition into the 21st century learning and curriculum. "The balance between the traditional way of life and modern education is addressed first and foremost through the curriculum"[40] (Schmidt, Y., 2014). This should be done with the aim to empower students to learn and collaborate in ways that are current and relevant. As (Schmidt, Y., 2014) points out "many First Nations people also stress on the link between education and employment, particularly, that the goal of public school education is to equip

[40] Schmidt, Y. (2014). *Yukon's Public School Education System, A 360º Perspective*. Retrieved June 1, 2015, from www.actioncanada.ca

students with the skills and knowledge needed to succeed in the modern economy".[41] Therefore, it is important to understand that the need to equip them with the knowledge and skills of today's modern economy will only help them overcome future employment challenges and may likely empower their future generations.

[41] Schmidt, Y. (2014). *Yukon's Public School Education System, A 360º Perspective*. Retrieved June 1, 2015, from www.actioncanada.ca

Yukon - Challenges and Opportunities

Academic Challenges

High School Exit Surveys[42]:

According to (Schmidt Y. 2014), the Department of Education implemented a High School Exit Survey in collaboration with the Yukon Statistics Bureau to track a cohort of students who could have graduated in 2010 over successive years (See Appendix E: Graduation Rates). As per the latest follow-up report of Dec. 2013, less than half of the original participants completed the follow-up survey.

As per the following Fig. 1.0 and Fig. 2.0 both taken from (Schmidt, Y. 2014), a comparison of the two figures shows student perceptions of how well high school prepared them for college or university. The majority of students felt that high school only prepared them somewhat well[43].

"A majority of those students who did attend college or university said high school could have set higher standards, pushed them harder, and taught practical skills like time management and organization, the report does not specify what proportion of those students needing upgrading were First Nations or non-First Nations"[44]. (Schmidt, Y. 2014)

[42] ibid, 42
[43] ibid, 42, "The report thus qualified its results by adding "[t]here is not enough information available about the non- participants to allow us to estimate and correct for non-response bias. It must be noted that, the results presented in this report are only indicative of the experiences of those individuals who participated in the survey, and they may not be representative of the entire cohort." (Schmidt, Y. 2014)
[44] ibid, 42

Figure-1.0: Student responses on how well high school prepared them for desired career paths[45]

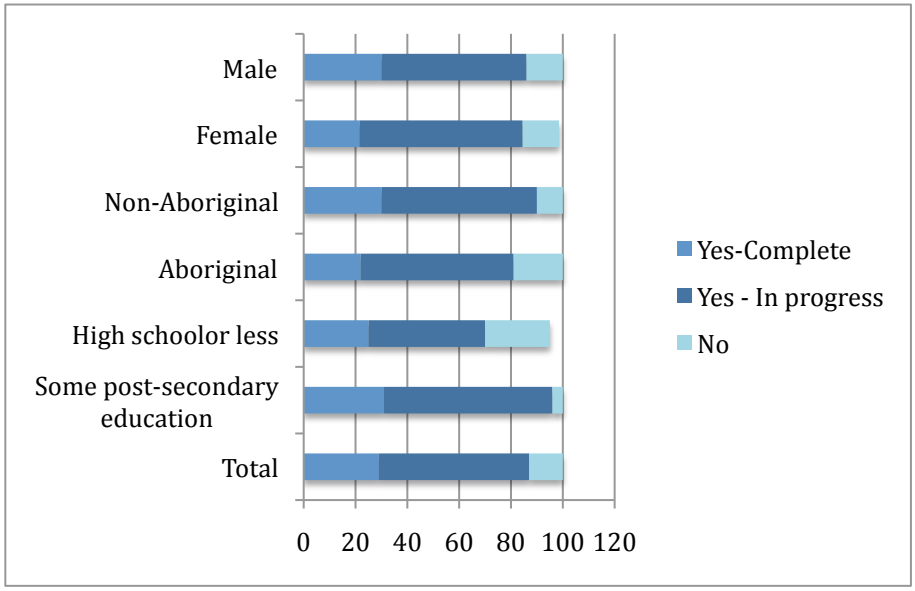
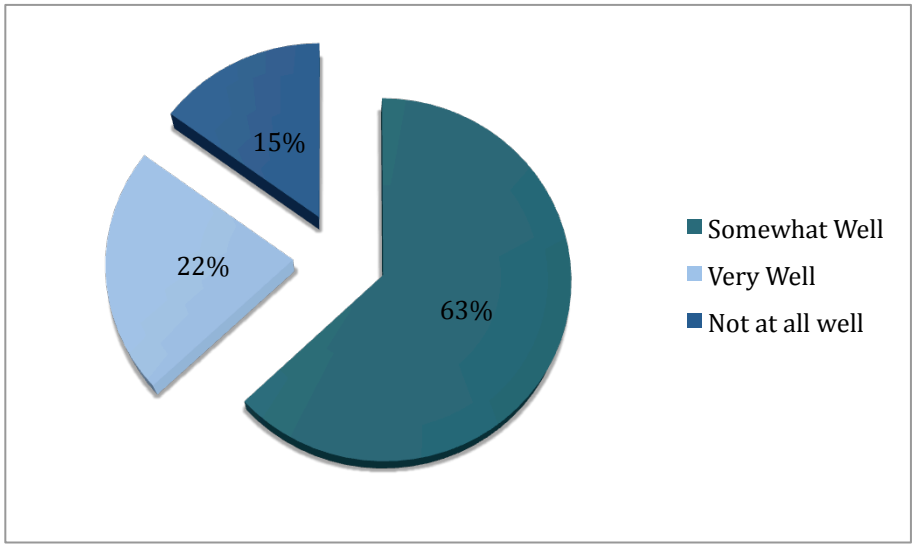


Figure-2.0: Student responses on how well high school prepared them for college or university[46]



[45] ibid, 42
[46] ibid, 42

Absenteeism:

Absenteeism in schools is also one of the main challenges in the Yukon that affects student academic performance directly. "As per the High School exist survey (discussed in above) absenteeism is one issue that respondents consistently cited as a central hindrance to their academic success"[47]. Schmidt, Y. (2014)

First Nations Challenges:

Historically, First Nations had to go through the ordeal of the school system called residential schools. The painful experiences the student had to go through left a lingering effect on their hearts and minds. (Schmidt, Y. 2014) states that recently, psychological literature has begun to refer to "intergenerational trauma" to describe the residual impacts of residential schools on First Nations today. It doesn't necessarily mean that trauma is genetically transmitted, yet instead identifies the root of the social and economic issues facing aboriginal communities today in the legacy of residential schools[48]. (Schmidt, Y. 2014) also notes that in March, former Assembly of First Nations Chief Shawn Atleo encouraged aboriginal Canadians to "turn the page" on residential schools for the sake of their younger generations, saying: "We will never forget. But we must not burden another generation with anger and pain."

[47] ibid, 42
[48] ibid, 42

Although, Harper's government has been compensating the victims, starting last year, it may not be enough to take the pain off completely from their minds. Investments may need to be made into the future of their children too in order to subside this ongoing pain.

Social Challenges:

Compared to the south, the social landscape of the northern territories is drastically different. Schmidt, Y. (2014) states that although Yukon follows the BC academic curriculum, "data has consistently tracked a gap between rural and urban outcomes… in part likely due to different academic environments… it is likely also in part the result of social and economic challenges that exist in many rural communities across the North such as higher incidence of violence, drug and/or alcohol addiction, and suicide"[49]. There are risk behaviours among friends and peer groups, majorly including the higher rate of alcohol and drug intake, mostly among rural students, and the high frequency of sexual activity among both urban and rural female students.

As per Schmidt, Y. (2014), boys in rural areas usually in bigger grades see schools in a negative light and think their teachers don't care about them as persons; however, at most a third in any group say they like school a lot. There's a lack of resources at the school level to deal with these socio-economic issues, however, the Education Department's Student Support Services website shows the various services available for students. On northern teacher workloads, a study showed that "…on average, northern teachers already work overtime with insufficient support, leading to stress and burnout"[50]. The challenges facing students who transition from communities to Whitehorse to attend secondary school is another issue. Most of these students

[49] ibid, 42
[50] ibid, 42

are First Nations. The ERP describes "they have to adjust to a new school, new rules, regulations and new living arrangements… with a much greater number of students. Everything is unfamiliar... This can make them frustrated and confused, and in some cases can cause them to miss classes or drop out of school." Compared to when"…They are at home with their families, and have the support of extended family" as per ERP.

Digital Literacy and Digital Divide Challenges:

The digital divide usually has a direct impact on digital literacy[51]. Digital literacy is dependent on the accessibility of digital technology. Digital Literacy is more often linked to a country's economic growth, usually reflective through the economic indicators. Living in a developed country like Canada that ranks 2nd highest in internet penetration after UK in the G8 countries as per CIRA[52], may make us think that there is no significant digital divide in the country or whether we should even worry about it. According to a recent IPSOS Reid study "The Digital Divide Remains Wide" in Canada; it was "predicted to disappear, but our research shows that while the gap is narrowing slightly, the divide is very real" (IPSOS Reid, 2007).[53] Hoechsmann, M, DeWaard, H. (2015) explains, " These divides can be geographic and educational, as noted in this paragraph, but, more fundamentally and in global terms, digital divides are markers of economic and social inequality."

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[51] Digital Divide in Canada. (2010, November 29). Retrieved July 6, 2015, from https://cleach.wordpress.com/digital-divide-in-canada/

[52] The Canadian internet. (n.d.). Retrieved July 26, 2015, from http://www.cira.ca/factbook/2014/the-canadian-internet.html CIRA Fact Book 2014

CIRA FACT BOOK 2014. (2015). Retrieved July 17, 2015. www.cira.ca/factbook/2014/the-canadian-internet.html

[53] ibid 51

"The digital divide exists within the Canadian high school system as well, based on the same factors of gender, rural-urban area, and socio-economic status"[54].

"Due to the expense of Internet access and support in rural areas, school boards in these areas are not always able to afford similar levels of ICT as the urban boards. Rural schools seem to be disadvantaged in various ways. Rural schools are less likely to have a well-trained specialist and less educational software; they use fewer types of specialized software in different subjects. Rural schools are also less likely to have different types of technical training for teachers. The results suggest that the priority given to ICT use and support in the school is lower in rural as compared to urban schools (Looker & Thiessen, 2003)".[55] As the use digital technology increases, the urban and rural Canada technological gap will also increase if timely measures are not taken.

Technology and Digital Infrastructure Challenges:

The key challenge causing the digital divide and other technology related issues are the insufficient investment by the telecommunications sector in laying a strong digital infrastructure. A report released in December 2012 by Lemay-Yates Associates called "Yukon Telecommunications Development" states that Northwestel, a Bell Canada company, and the only telecommunication company in the Yukon, has been making investments in its network, although not at a pace to support a 4 to 5 fold increase in its backbone capacity[56]. According to the report, " history has demonstrated that Northwestel is unlikely to invest in infrastructure that cannot be justified in a near-term business case. A lack of focus on long term objectives and

[54] ibid 51
[55] Digital Divide in Canada. (2010, November 29). Retrieved August 26, 2015, from https://cleach.wordpress.com/digital-divide-in-canada/
[56] *Yukon telecommunications development final report*. (2012). Verdun, Que.: Lemay-Yates Associates.

chronic underinvestment in infrastructure prompted the CRTC to require Northwestel to produce a "modernization plan" and to initiate a "holistic" review of telecom in the North"[57].

Further, Hoechsmann, M., DeWaard, H. (2015) notes, "The telecommunications companies that provide Internet service operate within a given country and geography play a role in how communities will access broadband service, if at all. In particular, rural communities, and especially those in the North, have much less access to reliable high-speed Internet. Thus, there are digital divides that distinguish access to some of the potentials of digital literacy and there are specific local approaches to organizing participation.[58]"

"Internet connectivity and the lack of access to, cost of, high speed Internet connections continues to be a major barrier for Aboriginal communities"[59]. The Conference Board of Canada in its report on 'Aboriginal Digital Opportunities' concluded that 'there is a significant danger the Aboriginal Peoples will be left behind and disenfranchised as the pace of technology adoption and integration in the economy increases...with knowledge generation increasingly tied to wealth creation, communities with unskilled labour and insufficient technological infrastructure will be challenged to match the rate of development in society as a whole' (Downing, 2002)[60]. "With no government involvement in sight, the Canadian digital divide will continue to expand. The largest ISPs will continue to introduce faster fibre to the home for a

[57] Ibid. 56, http://www.economicdevelopment.gov.yk.ca/pdf/LYA_Yukon_Telecoms_Final_Report_Dec_2012.pdf- (n.d.). Retrieved August 16, 2015, from http://www.economicdevelopment.gov.yk.ca/pdf/LYA_Yukon_Telecoms_Final_Report_Dec_2012.pdf
[58] Hoechsmann, Michael, DeWaard, Helen. (2015) *Mapping Digital Literacy Policy and Practice in the Canadian Education Landscape*: MediaSmarts.
[59] Digital Divide in Canada. (2010, November 29). Retrieved August 26, 2015, from https://cleach.wordpress.com/digital-divide-in-canada/
[60] ibid 59

handful of customers in urban centres, but leave many rural communities stuck on the Internet slow-lane" (Geist, 2008)[61].

This divide has an impact on the Internet subscription costs. In the Yukon, customers pay much higher prices per GB as compared to their urban counterparts for a very low speed Internet connection. Internet penetration rates are a function of household incomes; hence, the urban penetration has always been higher than the rural. In urban areas also, places like schools, libraries, wifi hotspots, workplaces etc. are usually used for free Internet or wifi access in cases where the affordability of the Internet is limited. Since the use of Internet has become so common and important, especially for students and businesses that free access to Internet in public places and wifi hotspots are becoming an important part of the whole equation, leading to "digital dependence". Also, the availability of 4G devices and a revolution through Internet of Things (IoT) is taking digital access to the next level. This is the digital age at its real pinnacle.

[61] ibid 59

The Inevitable Digital Age

Digital Literacy Defined:

"Digital literacy is the ability to find, evaluate, utilize, share, and create content using information technologies and the Internet"[62] as defined by Cornell University, USA.

To understand the latest capabilities for a digitally literate person Hoechsmann, M., DeWaard, H. (2015) have explained the whole idea very interestingly by coining an appropriate term based on they way information being utilized, it says, "One of the primary transformations of the digital era in the 21st Century has been the introduction of end-users as actors in the world of communication, autonomous "prosumers" (producers and consumers of information) who can access and disseminate content in Web 2.0 domains without the regulatory controls of traditional filters and gatekeepers"[63]. Such technological capabilities not only increase the possibilities of digital interaction and production, but also increase pressure to follow a code of conduct to stay ethical digital citizens.

Digital Literacy and Digital Citizenship Frameworks[64]:

The idea that digital literacy fits into a broader educational vision is prevalent across Canada[65]. Hoechsmann, Michael, DeWaard, Helen. (2015) state, that models of 21st century learning give educators an opportunity to re-view, re-envision and re-map the role of education in the lives of

[62] Cornell University - Digital Literacy Resource. (n.d.). Retrieved August 31, 2015, from https://digitalliteracy.cornell.edu
[63] Hoechsmann, Michael, DeWaard, Helen. (2015) *Mapping Digital Literacy Policy and Practice in the Canadian Education Landscape*: MediaSmarts.
[64] Ibid, 63
[65] Ibid, 63

young people within the broader digital contexts while considering factors such as the changing conditions of work and life in an era of globalization and economic uncertainty.

According to Hoechsmann, M., DeWaard, H., (2015) "across the Canadian landscape, education ministries and school systems establish directions and navigate toward best practices with digital technologies. A recent symposium of the Council of Ministers of Education, Canada (CMEC) focused on strategic directions, collaborative networks and future actions to ensure Canadians acquire essential skills to succeed in a global economy. (CMEC press release, July 2014)".

Hoechsmann, M, DeWaard, H. (2015) notes that "a sophisticated example of this vision is the one developed in the Northwest Territories based on five core competencies drawn into a holistic circle that unites community, home, workplace and school, and also individual life trajectories that include psychological (self), social (others) and spiritual dimensions as well as an acknowledgement of the physical context (the land)".

Digital literacy in Yukon Canada [66]:

Ontario and Yukon have adopted a more dispersed approach to digital literacy education.

The general statements given recommending ICT use in other subject areas, in both Ontario and Yukon, provide minimal specific direction for teachers and do not guarantee any consistency of digital literacy education. Hoechsmann, M., DeWaard, H., (2015). In the Yukon, this is

[66] Hoechsmann, Michael, DeWaard, Helen. (2015) *Mapping Digital Literacy Policy and Practice in the Canadian Education Landscape*: MediaSmarts.

somewhat tempered by the Technology Assisted Learning Unit which provides direction and resources to students and teachers. Hoechsmann, M., DeWaard, H., (2015).

The Yukon department of Education describes 21st century literacy as the "ability to identify, comprehend and communicate in oral and written languages, and increasingly through the use of media technology". (Department's strategic Plan 2011- 2016: Our Commitment to New Horizons). Hoechsmann, M., DeWaard, H., (2015). Yukon follows the BC English Language Arts curriculum, which includes a component of 'literacy in the area of information and communication technology' that involves "the ability to obtain and share knowledge through investigation, study, instruction or transmission of information by means of media technology" (English Language Arts 8-12, 15). Hoechsmann, M., DeWaard, H., (2015).

Furthermore, In the Yukon, the Aurora Virtual School, has been piloted recently. This initiative, technically a "school," aims to allow students to learn independently and flexibly. It offers distance and home education support. Additionally, it offers a credit recovery option that enables students to retake courses independently under the supervision of a teacher or a learning assistant[67]. Schmidt, Y. (2014).

Digital Citizenship – Roles and Responsibilities:

As most of the "good things" or services, as discussed in the beginning of the paper, are shifting from the physical world to the cyberspace, similarly the "bad things" are also moving there at the same pace. "Bad" like hacking or stealing someone's personal information and using it against him or her, online scams, bullying, infringement to one's right to privacy and so on so forth. The same way we protect ourselves from such dangers in the physical and the cyber worlds, we need

[67] Schmidt, Y. (2014). *Yukon's Public School Education System, A 360° Perspective*. Retrieved June 1, 2015, from www.actioncanada.ca

to keep others safe from these dangers in the same way also. A major part of being a digital citizen is to understand the context of the empowerment that a student or a digital citizen readily feels entitled to. It is of the utmost importance that a student understands the open and present dangers and perils of operating in the cyberspace. Hazards like cyber-bullying, moneymaking scams, digital piracy and unnecessary exposure to one's personal information can put a student in a compromising position. The schools can help guide students understand their responsibilities and set limits while operating in unregulated and interactive digital spaces. They can help the students develop the right skills required to protect their own privacy and online standing so that they don't become prey to money-making scams and other manipulative requests that the cyberspace is filled with. YESNet (Yukon Education Student Network) is a resourceful website and provides outside resources for teachers, students and parents to keep abreast of the digital world. On its Digital Literacy resource page, this quote is featured: "Digital Citizenship prepares students to use digital media safely, confidently and wisely. It is the essential first step to Media literacy". (www.cyberwise.org)[68]. With the help of such and other important websites, the team of students, teachers and parents can stay informed of any online danger or scam, share such information at school with peers and take necessary actions to stay safe and keep others safe.

[68] CyberWise | No Grownup Left Behind! Online Safety | Parents/Teachers. (n.d.). Retrieved August 28, 2015, from http://www.cyberwise.org

Models of Online Education Delivery[69]:

Delivering education through digital means is applied within along a continuum of models – face-to-face, hybrid, blended, flipped, online and distance. Here we adapt the e-learning continuum (Bullen, 2013) where learning with technology and electronic tools ranges from face-to-face to fully online, distance learning spaces[70].

Blended[71]:

"When people talk about "blended learning" they are usually referring to the place where learning happens, a combination of the classroom and online." Stommel (2012)[72]

"The model for blended learning integrates the mobility of digital and online technologies within bricks and mortar learning spaces. This model enables networked student learning and collaboration, as well as ongoing access to learning materials for personalized learning. This manner of utilizing digital technologies strategically allows learners to access, use and create curricular content in a supported environment". Hoechsmann, M, DeWaard, H. (2015).

Blended learning facilitates greater personalization of time, location, pace and learning pathways[73]. Alongside the digital technologies being integrated and infused into brick and mortar classrooms, education ministries are providing digital spaces for learners through access to

[69] Hoechsmann, Michael, DeWaard, Helen. (2015) *Mapping Digital Literacy Policy and Practice in the Canadian Education Landscape*: MediaSmarts.
[70] ibid. 68
[71] Ibid, 68
[72] ibid. 68
[73] Ibid, 68

Learning Management Systems (LMS) (e.g. Desire 2 Learn (D2L), Blackboard, Moodle). The creation of the Canadian e- learning network (CANeLearn) will focus on sharing and supporting resources and foster professional development for blended and online learning (Barbour, 2013, p. 19). Finding ways to engage all students across diverse contexts in blended learning spaces will further the equitable spread of learning opportunities in digital spaces.

Flipped[74]:

"Flipped Learning is a pedagogical approach in which direct instruction moves from the group learning space to the individual learning space (home), and the resulting group space is transformed into a dynamic, interactive learning environment where the educator guides students as they apply concepts and engage creatively in the subject matter". - Flipped Learning Network

The problems that Flipped model can create may include over burdening students with workloads and aggravate digital divides for students who have limited technology access at home. However, if socially favorable learning spaces are created in schools with the required supports, some of the disadvantages can be triumphed over.

Hybrid[75]:

Hybrid learning models integrate components of face-to-face, blended and flipped learning[76]. Christensen, Horn & Staker (2013) define hybrid models as a "combination of the new,

[74] Hoechsmann, Michael, DeWaard, Helen. (2015) *Mapping Digital Literacy Policy and Practice in the Canadian Education Landscape*: MediaSmarts.
[75] ibid 68
[76] ibid,68 While educators often use the terms hybrid learning and blended learning interchangeably, there are subtle differences, primarily associated with the ratio of time spent in the physical classroom.

disruptive technology with the old technology [that] represents a sustaining innovation relative to the old technology"[77]. The NMC Horizon Report: 2014 K-12 describes hybrid models that "enable students to use the school day for group work and project-based activities, while using the network to access readings, videos and other learning materials on their own time, leveraging the best of both environments". As governments are actively funding hybrid-learning models, more hybrid opportunities for learning will become integrated into the learning landscape[78]. Learning will extend beyond the classroom into diverse spaces and places[79].

As per Christensen's prediction, with Hybrid, Traditional classroom models will be disrupted and adopt digital technologies. Therefore, a better student-teacher relationship needs to be envisioned.

[77] Ibid. 68
[78] ibid. 68
[79] ibid. 68

Rethinking the Role of Teachers:

In ideal situations, the teacher's role is becoming that of a mentor, visiting with groups and individual learners during class to help guide them, while allowing them to have more of a say in their own learning[80]. In order to be prepared to guide learners to effectively use the Internet, teachers are increasingly expected to be knowledgeable on the practices, skills, and resources that will be useful to students as they continue their education and seek gainful employment[81]. Hoechsmann, M., DeWaard, H., (2015) notes, "The notion of teacher leadership is not new. Lead teachers are present in many schools or systems in a variety of roles and purposes. Leadership comes from a growth mindset and a risk- taking attitude. When teachers become leaders in their own learning, there is a greater sense of purpose and connection. Digital media and electronic communication is opening doors and creating new opportunities for more teachers to lead by example"[82].

The teachers will need to become more connected and collaborative, that may sometimes mean in spaces outside of school buildings and during non-working hours. In addition, help from country or region specific resources like CANeLearn, Global Education Network, iEARN Canada, Canadian Educators Association (CEA) to name a few, will help serve the teacher communities and provide them relevant information to help understand and implement practices.

[80] Johnson, L., Adams Becker, S., Cummins, M., Estrada V., Freeman, A., and Ludgate, H. (2013). *NMC Horizon Report: 2013 K-12 Edition.* Austin, Texas: The New Media Consortium.
[81] Ibid, 68
[82] ibid, 68

Available Options and Trends in Digital Technologies in Education:

The NMC's latest research efforts, the NMC Horizon Report: 2013 K-12 Edition and the NMC Horizon Report: 2013 Higher Education Edition together highlight ten emerging technologies that will impact education over the course of the next five years that include cloud computing, mobile learning, learning analytics, open content, 3D printing, MOOCs, virtual and remote laboratories, games and gamification, tablet computing, and wearable technology[83].

Hoechsmann, M, DeWaard, H. (2015) have pointed out four major trends in digital technology helping in delivering of education. "When describing the terrain of digitally enhanced education, consideration needs to be made of the physical space, environment and the ecosystem in which teaching and learning occur"[84]. The trends pointed out by Hoechsmann, M, DeWaard, H. (2015) include (i) mobility - *hand-held devices and bring your own devices (BYOD)*; (ii) interactivity – *interactive whiteboards (Smart boards, Promethean boards)*; (iii) openness - *within ever expanding places for learning - from physical classroom space to school-based (e.g. learning commons), to community and local resources/references, to open Internet-based learning spaces;* and (iv) augmented - *spaces through the application of QR codes, augmentative reality software and wearable tech.*

[83] Johnson, L., Adams Becker, S., Cummins, M., Estrada V., Freeman, A., and Ludgate, H. (2013). *NMC Horizon Report: 2013 K-12 Edition.* Austin, Texas: The New Media Consortium

[84] Hoechsmann, Michael, DeWaard, Helen. (2015) *Mapping Digital Literacy Policy and Practice in the Canadian Education Landscape*: MediaSmarts.

Choosing the Right Tools:

As pointed out above, one of the trends is cloud computing, and there are many compatible, comparatively priced applications and devices ready to help students and teachers deliver education, learn and collaborate through the use of cloud. These mainly include the LMS, Edmodo, CMS and Google Apps including Google Docs, Drive and the newly launched Google Classroom app. For devices options Google Chromebooks is a reasonably priced device, specifically for cloud storage and location independent learning (unlike laptops that also have local storage). Besides, with any tools Social Media, Video/Photo sharing and Web Conferencing are always there to add the oomph for timely and effective collaboration and sharing. Now schools no more need to invest heavily in maintaining and supporting their hardware infrastructure. Cloud based infrastructure services allow hosting of enterprise applications at a fraction of the cost as compared to traditional systems. Also, cloud based infrastructure is flexible and can be expanded or reduced on needs basis; thus, providing extra cost savings without affecting performance. Options include Google Cloud, Amazon Cloud, Microsoft Azure, IBM Smart Cloud, Intel and Yahoo.

Digital Collaboration – Anytime, Anywhere

The Cloud:

Cloud computing refers to expandable, on-demand services and tools that are served to the user via the Internet from specialized data centers and consume almost no local processing or storage resources[85]. Cloud computing resources support collaboration, file storage, virtualization, and access to computing cycles. (the NMC Horizon Report: 2013 K-12 Edition).

Over the past few years, cloud computing has been firmly established as an efficient way for businesses to protect data, develop applications, deliver software and online platforms, and collaborate[86]. Schools are deploying similar cloud-based strategies to boost collaboration, productivity, and mobility in teaching and learning.

Some are concerned, however, that many low-cost public cloud services may not meet national privacy and data protection standards and requirements for schools and students. Private cloud computing solves these issues by providing common cloud solutions in secure environments, and hybrid clouds provide the benefits of both types.

Why Cloud Computing for online learning?

The main reason Cloud computing got very popular is because it moves the processing efforts from the local devices to the data center facilities. Hence, any device, like an Internet connected

[85] Johnson, L., Adams Becker, S., Cummins, M., Estrada V., Freeman, A., and Ludgate, H. (2013). *NMC Horizon Report: 2013 K-12 Edition.* Austin, Texas: The New Media Consortium

[86] Johnson, L., Adams Becker, S., Cummins, M., Estrada V., Freeman, A., and Ludgate, H. (2013). *NMC Horizon Report: 2013 K-12 Edition.* Austin, Texas: The New Media Consortium

phone, could be able to solve complex matters that once needed bigger stationed computers. Any matter can be attended to without the boundaries of time and space with any Internet connected device and save time, money and effort. Whether it is data storage, accessibility or dissemination, with cloud it can be achieved more conveniently in lesser time. However, the security of data and applications may need more attention while performing any online activity.

Many educational institutions have started to look at cloud learning as a substitution or supplement to the traditional teaching practices. There are many reasons considered besides the changing landscape of the Knowledge and Digital Economy impacting the learning behaviors of students as to how they understand, access, use, experience information and create or distribute knowledge[87]. (source: cloudlearning.weebly.com-cloud learning in K-12 system).

Cloud computing can save schools major infrastructure costs that can be invested in providing hardware or mobile devices to students. From a computer to a mobile, anything that connects to the Internet can be used as the client hardware, whereas a simple web browser or a dedicated application can work as a client application.

Mobile devices, regardless of hardware or software limitations, support multimedia apps. Although, mobile multimedia apps can have limitations of power and memory; however, in case of cloud computing, the data processing is on the server side, which makes the use of mobile devices fast and convenient especially for location independent education.

[87] Cloud Learning in the K-12 System. (n.d.). Retrieved July 28, 2015, from http://cloudlearning.weebly.com/

Pros of Cloud[88]:

There are some clear pros that make Cloud computing popular to use. First, it is low cost or even free in some cases, and the hardware upgrades are either free or just for a very small amount; Second, the clients don't need to pay the license upgrade fees and there is no need to download or install specific software, only the Internet connection is required; Third, any device with minimum hardware and software requirements can be used to access cloud via Internet; Fourth, there are almost no data loss or crash recovery issues as the data is saved on secure cloud, not the devices; Last, for some applications (like spreadsheets) it can be used even in the offline mode and initiates synchronization process as one goes back online.

Cons of Cloud[89]:

Some of the main disadvantages of cloud computing include Firstly, the speed of the Internet connection may affect the overall performance; Secondly, in the long run the data center subscription fee may be more expensive than buying the hardware; and lastly for data security, the backups are crucial.

[88] Pocatilu, P., Alecu, F., & Vetrici, M. (2010). Measuring the efficiency of cloud computing for e-learning systems. *WSEAS Transactions on Computers*, *9*(1), 42-51.

[89] Pocatilu, P., Alecu, F., & Vetrici, M. (2010). Measuring the efficiency of cloud computing for e-learning systems. *WSEAS Transactions on Computers*, *9*(1), 42-51.

The Verdict:

Understanding the socio-economic, geographical, historical and climatic issues and understanding that the total population of Yukon is not substantial enough to make an investment in the digital infrastructure that may provide them with technologically perfect solutions in hopes of getting them back to school and ready on their feet with 21st century employable skills and with teachers' and parents' roles modified through professional development trainings, seems a little far-fetched currently.

However, too often it is education's own practices that limit the broader uptake of new technologies. Whether it's insufficient ongoing professional development or the reluctance to accept the need for digital media literacy, significant challenges stand in the way of smooth assimilation[90].

Taking inspiration from the globally successful examples of MOOCs and Khan academy with their "anytime, anywhere education" approach allowing students to learn at their own pace and inquiry, with the power and possibilities of just the Internet connection, and the collaborative capacity of the cloud technology, delivering online education is however "conditionally feasible" in many remote and under-privileged areas, including those of Canada.

For the Yukon; provided that the government, in partnership with the telecommunication and technology sector, funds and/or channels resources in the required digital infrastructure, lowers or subsidizes costs of internet connectivity, provides cheaper or subsidized learning devices (such as Chromebooks or tablets that are cheaper than laptops) and brings teachers, students and

[90] Hoechsmann, Michael, DeWaard, Helen. (2015) *Mapping Digital Literacy Policy and Practice in the Canadian Education Landscape*: MediaSmarts.

parents up to speed with the available solutions to the challenges of the new and evolving "digital world".

The challenges that the authorities may need to address for empowering students to get in tune with the Smart Schools of the 21st century may include the facilitation in spreading digital literacy while training all the three parties (i.e. students, teachers and parents) on how to conduct themselves online in a manner that is non-threatening and conducive to high quality online mannerisms while instilling in them the understanding of safety, security and reputation of one's own and others co-existing in the unregulated digital environments, understanding the privacy of one's own and others' personal information and clearly understanding all the rights and responsibilities that comes with being a netizen, digizen or a digital citizen, besides the provision of high speed Internet at an affordable price in partnership with the telecommunication sector.

Conclusion:

As discussed above that with the successful disruptive models like MOOCs and Khan Academy, "Anywhere, Anytime" learning is proliferating opportunities of upgrading one's skills, regardless of time and space, through just an Internet connection. Similarly, cloud technology with the relevant LMS applications or software, are being successfully used in urban Canada for the delivery of online education. These are comparatively faster; less expensive to implement compared to many other ICT based solutions and have the capability to effectively transform the way we all know classrooms. The idea of cloud computing applications is to help users spread out resources and work intelligently by moving everything to the cloud.

On the other hand, as we understand from our research, the challenges with Yukon students generally pick up as they move to higher grades and transition into schools of Whitehorse, the urban part of Yukon. This transition may lead to a sense of alienation, desire for absenteeism, social misconduct and academic breakdown. However, these socio-economic, personal, psychological, health and administrative challenges need specific and relevant solutions by the respective authorities to help the Yukon residents integrate smoothly into the broader sphere of the Canadian society as a contributing part. It is not included in the scope of this MRP to provide remedy or solutions to these challenges. Although, most of these challenges have already been provided with solutions by the authorities through various programs and partnerships and are continuously in effect helping the residents of Yukon for many years. However, impact of such socio-economic factors on the education sector is huge and is affecting the way residents of Yukon are choosing options for education and lifelong learning for their children and themselves.

Practically speaking, the transition from the traditional to modern living that sounds more like a utopian life, promises much brighter future for their children and youth; however, it is going to be the toughest challenge for authorities to implement, both in terms of laying the digital infrastructure and bringing the Yukon residents including students, teachers and parents on board to blend into that life.

Digital literacy, however, is inevitable, especially in a digitally advanced country like Canada. Not bringing the remote or the rural areas of Canada up to speed with digital innovation and modern learning in time may have major consequences. These consequences may not only increase the national digital divide but also may likely increase the divides within the country in terms of social, economic and political exchanges, engulfing the rural or underdeveloped Canada into more detached economies increasing differences and decreasing opportunities of a collaborative, modern and a developed 21st century nation.

Therefore, there is a critical need now to initiate efforts of introducing the basic digital learning models of the 21st century learning into schools of the Yukon (and probably other) remote and rural regions of Canada. As any change that starts from the grassroots level is likely to be more productive, sustainable and disruptive; therefore, there's no place better than the schools to sow the seeds for this change. The first generation of the Yukon students that undergo this change will help mark the beginning of a new era in Yukon's education sector, simultaneously helping policy makers and curriculum designers in studying this model for future improvements for making the program more effective and appealing to the rest of the Yukon students. Eventually,

this effort may likely lead the Yukon students into feeling empowered and they may likely act as catalyst of change by helping proliferate the digital literacy and online learning by setting a precedent for the coming generations of the Yukon.

Having said that and understood the basic premise or hypothesis, the two-phased model presented here is only a starting point as a response to the limited research investigating the feasibility of delivering online education which may likely help students initially integrate into the school system and help them learn to take responsibility as they graduate and move forward. It is suggested to start off with a very basic "blended" model of education in the initial school years, such as from K-8, in the current digital infrastructure, by combining both the practices of the traditional and modern schooling system and gradually increasing the adoption of digital learning practices within the same model as students start to show acceptance and improvements in the first phase, to later ideally merging into a more open-space learning format through (a bit of the "hybrid" and eventually) adopting the "flipped" model approach as this generation (the Generation Z) enters bigger grades, from grades 9-12, in the second phase. This will likely allow students to adapt to the existing school system and eventually create a new school culture equipped with the tools and technology of the 21st century at their own inquiry and pace. Going forward, it can also help them become more accountable for their actions and learn the right skills to integrate into their preferred professions.

The government is already investing in the distant and online education system in Yukon and other rural areas to promote a healthy environment. However, this effort needs to be amplified in order to eradicate the prevailing issues that are keeping the students of Yukon at a disadvantage.

This initiative of providing students access to education in tune with the current times will allow Yukon residents to be effective contributors to the Canadian economy. The government has already taken a step forward towards solving the problems related to their lingering past of getting education in residential schools, by compensating them monetarily against the physical and psychological damages that may have been caused to them in quest of getting education. Now, what is going to be a logical next step is to invest in the future of the First Nations and other Yukoner's current and next generations so that their integration in Canadian society is infallible. This way the government will come full circle, from undoing the effects of residential schools to providing the facilities of 21st century digital schools. With the government's continued support in coming years especially with the cost of education, likely laying a digital infrastructure with a new or the existing telecom partner, and building the student-teacher-parent connect will also likely allow the native residents to put the past sufferings and painful incidences experienced by their previous generations behind and move forward in the quest for educating their next generations at their own pace, inquiry and on their land. This effort will help empower them to step into the future with employable skills and greater confidence to meet the demands of the 21st century.

Appendix A: List of Schools in Yukon:

Yukon's Urban Schools – Whitehorse	Yukon's Rural Schools
K-12 Virtual School - 1	K-8 - 1
Elementary Schools - 8	K-9 - 4
Secondary School -2	K-10 - 1
Catholic Elementary School - 2	K-12 - 6
Catholic Secondary School - 1	Elementary K-7 – 1(Weston lake)
K-12 French First Language School - 1	Secondary 8-12 – 1 (Weston lake)
Total Urban: 14	Total Rural: 14

Appendix B: The Education Act[91]:

The fundamental goals and values of the education system are, first and foremost, to be found in the Education Act. The following excerpt is taken from that Act:

" The Minister shall establish and communicate for the Yukon education system goals and objectives, which are:

(a) to encourage the development of students' basic skills, including:

(i) the skills of literacy, listening, speaking, reading, writing, numeracy, mathematics, analysis, problem solving, information processing, computing,

(ii) critical and creative thinking skills for today's world,

(iii) an understanding of the role of science and technology in society, together with scientific and technological skills,

(iv) knowledge of at least one language other than English,

(v) appreciation and understanding of creative arts,

(vi) the physical development and personal health and fitness of students,

(vii) the creative use of leisure time;

(b) to develop self-worth through a positive educational environment;

(c) to promote the importance of the family and community;

(d) to provide opportunities to reach maximum potential;

(e) to promote the recognition of equality among Yukon peoples consistent with the Canadian Charter of Rights and Freedoms and the Human Rights Act;

(f) to develop an understanding of the historical and contemporary role of women and the reinforcement of the principle of gender equality and the contribution of women to society;

[91] Schmidt, Y. (2014). *Yukon's Public School Education System, A 360º Perspective*. Retrieved June 1, 2015, from www.actioncanada.ca; http://www.gov.yk.ca/legislation/acts/education_c.pdf

(g) to promote understanding of the history, language, culture, rights and values of Yukon First Nations and their changing role in contemporary society;

(h) to increase awareness and appreciation of the Yukon's natural environment;

(i) to develop an understanding of the historical and contemporary role of labour and business in society; and

(j) to prepare for participation in a Yukon, Canadian and global society".

Appendix C: Yukon's Department of Education Mandate & Strategic Goals:

Mandate[92]:

"Yukon Education's mandate is to deliver accessible and quality education to all Yukon learners including children and adults by:

1. Establishing meaningful partnerships that promote and support lifelong learning
2. Ensuring Yukon has an inclusive and adaptive labour market
3. Working in co-operation with parents to develop the intellectual, physical, social, emotional, cultural, and aesthetic potential of learners so they may become productive, responsive and self-reliant members of society
4. Helping students get the skills and knowledge they need to lead personally rewarding lives".

Strategic Goals[93]:

Yukon Education Goals:

1. Everyone who enters school in Yukon will have the opportunity to successfully complete their education with dignity and purpose, well prepared to enter the next phase in their lives.
2. Make Yukon's education system more responsive in order to support every learner.
3. Yukon has an inclusive, adaptable and productive workforce that contributes to and strengthens the economy."

[92] Schmidt, Y. (2014). *Yukon's Public School Education System, A 360° Perspective*. Retrieved June 1, 2015, from www.actioncanada.ca
[93] ibid.90

"Besides the strategic goals the education department also has specific goals as identified in its 5-year plan, they are as follows[94]:

1. Improving Yukon First Nation student achievement and outcomes
2. Increasing successful transitions for all students to different levels of education and the world of work.
3. Effectively managing resources in urban and rural schools
4. Collaborating with Yukon First Nations governments
5. Proactively addressing skilled labour shortages".

[94] Schmidt, Y. (2014). *Yukon's Public School Education System, A 360º Perspective*. Retrieved June 1, 2015, from www.actioncanada.ca

Appendix D: New Technologies and the 21st Century Learner:[95]

In the Yukon's Education Strategic Plan 2014-2019, the Department of Education understands and introduces the general need to incorporate the use of new technology by engaging students in more collaborative and productive ways. However, it doesn't present specific objectives related to any plan of action or policy as such. It says:

"Yukon Education's level of connectivity and strong support for learning technologies and programming has provided a learning environment in schools where learners are increasingly using existing and new technologies for research, communication and collaboration. Increased sophistication of technologies, powerful software applications, and the growth of access to wireless networks influence the need for strong media literacy skills to support the 21st century learner.

The information landscape and vast amounts of available information challenges the traditional notion of education. For example, interactive whiteboards allow teachers to move from traditional modes of classroom instruction to those in which students can be more engaged and where feedback on lessons learned is immediate.

Furthermore, the availability of huge volumes of content is transforming what it means to be an educated person in a digital world. Students today need to know how, where, and when to locate information from a variety of media, and they must possess skills to access, evaluate, synthesize, create and present new knowledge in a variety of forms.

New technologies are changing the way we think, learn, work and communicate. The 21st century learners in Yukon have access to a multitude of technologies and resources that will help

[95] Department'of'Education.'(2014).'*Yukon Education Strategic Plan, 2014-2019*.'6.'Retrieved'from'the' Department'website:'http://www.education.gov.yk.ca/pdf/Yukon_Education_Strategic_Plan_2014b 2019.pdf

prepare them with the skills to thrive in their chosen fields and to continue to ‘learn how to learn’ throughout their lifetimes”.

Appendix E: Education Act – First Nations Absenteeism Clause:

With respect to Absenteeism in schools "The (Education) Act has specific clauses with regard to First Nations student absenteeism due to traditional activities[96]. Although Section 27(1) of the Act considers absenteeism due to parental negligence or refusal to "take reasonable steps to cause the child to attend school" an offence finable at $100/day, the Act also provides an exemption in Section 22(2) if "the student is a participant in Yukon aboriginal cultural activities or in aboriginal harvesting activities."[97] Schmidt, Y. (2014)

[96] Schmidt, Y. (2014). *Yukon's Public School Education System, A 360° Perspective*. Retrieved June 1, 2015, from www.actioncanada.ca
[97] ibid, 96

Appendix F: Yukon's Graduation Rates:

The graduation rates table below is taken from Schmidt, Y. (2014); it states that the graduation rates are a main success metric used by the Yukon's Department (of Education). In addition, the Auditor General uses graduation rates to benchmark Yukon against other Canadian jurisdictions[98].

As per the table below from Schmidt, Y. (2014), we can see the trends over the past three years. The gap between First Nations and non-First Nations students, and between urban and rural students is notably high. This is certainly one of the key challenges that need to be addressed by closing the gap between the results of these two groups.

Table-Yukon's Graduation Rate:[99]

Urban / Rural	First Nations / Non-First Nations	2011 Grad Rate	2012 Grad Rate	2013 Grad Rate
Urban	Non-First Nations	(215/289) 74%	(240/272) 88%	(183/241) 76%
Urban	First Nations	(56 / 96) 58%	(61/105) 58%	(50/116) 43%
Urban Total		(271/385) 70%	(301/377) 80%	(233/257) 65%
Rural	Non-First Nations	(26/36) 72%	(18 / 28) 64%	(13/15) 87%
Rural	First Nations	(13/27) 48%	(17/29) 59%	(11/15) 73%
Rural Total		(39/63) 62%	(35/57) 61%	(24/30) 80%
Yukon	Non-First Nations	(241/325) 74%	(258/300) 86%	(196/256) 77%
Yukon	First Nations	(69/123) 56%	(78/134) 58%	(61/131) 47%
Yukon Total		(310/448) 69%	(336/434) 77%	(257/387) 66%

[98] Schmidt, Y. (2014). *Yukon's Public School Education System, A 360° Perspective*. Retrieved June 1, 2015, from www.actioncanada.ca
[99] ibid 96

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