

Facebook Usage among Urban Indigenous Youth at Risk in Ontario

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Thesis submitted in partial fulfillment of the requirements for the PhD degree in
Electronic Business Technologies, University of Ottawa

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Glossary of acronyms

AFN	Assembly of First Nations
FGD	Focus group discussion
ONFC	Odawa Native Friendship Centre
UNESCO	United Nations Educational, Scientific and Cultural Organization

ABSTRACT

Statement of the problem: Indigenous youth in Canada are much more likely to be either physically and/or psychologically at risk than other population groups in the same age range. However, help for indigenous youth at risk frequently arrives too late: it often takes too long for family, friends, community, and government to identify the indigenous youth who are at risk. Another problem is that it takes some time for anyone who is voluntarily seeking help to inform their closely connected family and friends about their at-risk situations. Besides these barriers, some conditions are associated with social stigmas especially drug addiction and mental ill-health. The delayed identification of indigenous youth at risk poses great challenges for how to provide them with assistance and treatment.

Research questions: This research aims to answer four questions: (i) How are indigenous organizations using Facebook to connect with youth at risk? (ii) How are urban indigenous youth expressing themselves on Facebook when they feel or are at risk? (iii) In what ways can the text mining of indigenous organizations' Facebook data identify the risks among urban indigenous youth and at-risk individuals? (iv) How can the findings from the research question # 1, # 2, and # 3 be adapted to enable Facebook's News Feed algorithm to address the needs of at risk urban indigenous youth?

Research methodology: This research used mixed methods for data collection. Qualitative data was obtained from field surveys that were conducted in the form of interviews, focus group discussions and observations. For the quantitative data collection, I gathered and analyzed the Facebook usage data of indigenous community organizations to discover their Facebook patterns using text mining techniques available in the SAS Visual Analytics application. Lastly, all the

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participants in focus group discussions were asked to answer a survey questionnaire seeking information related to his or her demographic and personal Facebook usage behaviour.

Significant findings: Many urban indigenous youths generate and share content on Facebook when they feel at risk physically or psychologically. Yet they do not see any content in their Facebook News Feed that is relevant or helpful to them for managing that risk, such as pointers to health and public services. This investigation also discovered that there are indicators such as the verbal tone of Facebook posts and images as well as changes in relationship status that could be used to help identify at-risk youth and provide them with helpful information. The research results also reveal that Facebook is a part of the problem insofar as it is a channel for such behaviours as cyberbullying, online harassment and the spread of harmful memes.

Contribution: The results from this research, when deployed, may help to improve the lives of indigenous communities by enabling the detection of youth who are at risk physically and/or psychologically and provide the necessary indicators for Facebook to adapt its News Feeds to bias the Facebook walls of the youth at risk with items such as positive posts found in their own cycle of Facebook friends' accounts and targeted news and advertising that can improve social outcomes for these populations.

ACKNOWLEDGEMENTS

I would like to thank the indigenous youth who participated in this project for sharing their stories and their encouragement of this research and Mr. Danny Volland, Innu indigenous scholar and candidate in Licentiate in Law (LLL) at the University of Ottawa, for reviewing the research proposal of the study. I would like to acknowledge the scholarships used to fund this study: the 2016 and 2017 Queen Elizabeth II Graduate Scholarship in Science and Technology; the Student Mobility Bursary from the University of Ottawa; and the PhD Admission Scholarship from the University of Ottawa.

I am grateful the following honours and awards that recognized the value of this research: the Graduate Student Excellence Awards from the Faculty of Engineering of University of Ottawa in the academic year 2016 and 2017 consecutively; the Finalist Honour from the Lieutenant Governor's Visionaries Prize in the Reconciliation Category in 2017; and the Peer Choice Award in Electronic Business Technologies and Systems Science from the 10th Faculty of Engineering Graduate Poster Competition at the University of Ottawa in 2017.

My thesis advisory committee members contributed significantly to the project: Dr. Diana Inkpen of the School of Electrical Engineering and Computer Science, University of Ottawa and Dr. Rukhsana Ahmed of the Department of Communication, University of Ottawa. Thank you for your engagement and insights. To my supervisor Dr. André Vellino of the School of Information Studies, University of Ottawa and my co-supervisor Dr. Odd Erik Gundersen of the Department of Computer Science, Norwegian University of Science and Technology, I extend my most profound gratitude for your guidance and insights throughout this process.

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In the fall of 2017, I was fortunate to be hosted at the TIK Centre for Technology, Innovation and Culture, University of Oslo by Dr. Fulvio Castellacci. This time helped me to advance my knowledge of ICTs and wellbeing and to consider youth at risk in an international project. *(See the Appendix K for the research paper I conducted at the TIK Centre).*

I dedicate this thesis to the indigenous youth who participated in this project and to my Canadian and Thai families for their endless support: My wife Dr. Naomi Tschirhart, my son Gabriel Ravee Intahchomphoo, my daughter Anya Lily Intahchomphoo, my mother-in-law Dr. Lee Jolliffe, my father-in-law Darrell Tschirhart, my brothers-in-law Aaron Tschirhart and Christian Tschirhart, my mother Kaywalin Intahchomphoo, my father Somboon Intahchomphoo, my stepfather Somboon Siritunyanont, my sister Pussadee Intahchomphoo, and my brother Worawat Pattana-areerat. Also, my life coach and my high school teacher Poonsuk Na Chiengmai who taught me to show kindness and pursue learning in daily life.

PREFACE

Overview of the thesis

This thesis is a thesis by article. Following the introduction and research methodology chapters are the four manuscripts that have been either accepted or submitted for publication in peer-reviewed journals. Following the articles, I conclude with a discussion section that connects each article with the others.

This overview gives an account of the sequence of the research process that led to this thesis. I began in Article 1, *Indigenous peoples, social media, and the digital divide: A systematic literature review*, to survey of the state of knowledge of the relation between indigenous peoples in Canada and social media. This paper was instrumental developing my thesis proposal. I found that there was a scarcity of research focusing on urban indigenous youth and social media, particularly related to mental health.

The next phase was to develop a thesis proposal in which the knowledge gaps identified in Article 1 would be filled. I began working on the research ethics application because this project involved vulnerable populations like urban indigenous youth living in Ottawa and personal information and privacy concerns related to the usage of Facebook's public data. My research ethics application was reviewed with great caution by the research ethics committee. I was asked to revise my research ethics application three times, and received extensive comments asking for revisions and clarifications. I also went beyond the research ethics requirements and asked an indigenous scholar to review my research proposal and ethics application to ensure that what I planned to do in my

research project would not cause any harm to the indigenous communities or individuals and was consistent with indigenous standards of ethics for such research.

After obtaining my research ethics approval, I then started to send out formal research participation invitations to communication managers and youth workers of indigenous organizations in Ottawa asking them for an interview to learn how they and their organization were using Facebook to connect and help urban indigenous youth at risk. The findings of this task were reported in Article 2, *Connecting with youth at risk: Indigenous organizations use of Facebook*. In parallel, I asked participants from Article 2 to help to recruit indigenous youth in Ottawa for my focus-group discussions. It was an effective way of recruiting my target research groups. I attempted to recruit indigenous youth to participate in my focus group discussions on my own by going to visit many indigenous organizations and events and I learned that this method of recruitment was not effective possibly because I had not yet earned the trust of the community. Therefore, I am grateful to my indigenous organization partners who helped me in this phase of my research. In the end, I was able to obtain high quality data from the focus-group discussions, which was reported in Article 3, *Facebook usage among urban indigenous youth at risk in Ontario*.

Next, I moved on to conduct the text mining of the public data of a sample of indigenous organizations' Facebook pages to demonstrate that text mining technology can be applied to identify some aspects of the life experiences and voices of indigenous peoples who express themselves on Facebook. The findings of this task were reported in Article 4, *Indigenous organizations and Facebook indicators for youth at risk*.

I wrote Article 4 while I was a Visiting Scholar at the TIK Centre for Technology, Innovation and Culture at the University of Oslo, working on an international research project on the effects of

ICTs and well-being funded by the Research Council of Norway. This gave me the opportunity to perform another systematic review, related to my thesis but applicable to the broader relationship between social media and youth suicide. I attached this paper as an appendix to this thesis by article since it was both relevant to the main body of the thesis and published in the proceedings of the European Conference on Information Systems 2018. During my time at the University of Oslo, I was informed that my doctoral thesis project was a finalist for the Lieutenant Governor's Visionaries Prize, so I returned to Canada to give a public lecture at their event in Thunder Bay, Ontario. A video recording of my talk is posted on the organizer's YouTube channel and I included the text of my speech as the last appendix in this thesis.

Once the main articles for this thesis were completed, I wrote the introduction, methodology, discussion sections and created single reference section that contains all the cited works in this thesis. I also included all of the supporting documents such as research consent forms and interview guidelines in the appendices. A few passages that occur in the published versions of the articles in this thesis were amended to address comments by the thesis committee.

Co-authorship

The co-authors of the articles in my thesis made significant but secondary contributions to this research project. Dr. André Vellino of the School of Information Studies, University of Ottawa oversaw the whole project, provided suggestions to improve the interpretations of the findings, and commented extensively on my journal articles. The other co-author is Dr. Odd Erik Gundersen of the Department of Computer Science, Norwegian University of Science and Technology, who acted as my co-supervisor. Dr. Gundersen also provided suggestions to improve the interpretations

of the findings and commented on journal articles in this thesis. However, I was the principal investigator of this project, I was responsible for all research activities.

Publication status

To date, the publication status of the articles in this thesis are as follows. Article 1, *Indigenous peoples, social media, and the digital divide: A systematic literature review*, has been published in *the American Indian Culture and Research Journal* (volume 42, no.3, 2018). Article 2, *Connecting with youth at risk: Indigenous organizations use of Facebook*, is in press (as of January 2019) in *the Journal of Community Informatics*. Article 3, *Facebook usage among urban indigenous youth at risk in Ontario*, was submitted for publication and is under review (as of January 2019) in *the Canadian Journal of Communication*, Article 4, *Indigenous organizations and Facebook indicators for youth at risk*, has been conditionally accepted subject to revisions (as of January 2019) in *the American Indian Culture and Research Journal*.

Research ethics

This research obtained research ethics approval (#H02-17-01) from the University of Ottawa's Office of Research Ethics and Integrity before the research began, given that the research involved human subjects who are indigenous. *(See Appendix I for the details of the Ethics Approval)*.

As I indicated above, the participants were approached directly with a formal letter that explains the research project details. This was done only for the individual interviews. For the focus groups, the researcher asked the partner local indigenous community organizations to recruit the potential participants using a formal recruitment letter that outlines the project objectives and contribution

along with the requirements for participation such as minimum age and experience with Facebook (*See the Appendix E, F, G, and H*).

The assessment of risks to human subjects this research was considered very low because it did not conduct any testing with the human body and no foreign object or substance was injected into the human body. More importantly, the research did not require or collect any personal identifiable information thus protecting the privacy of all research participants. This also applies to the written findings submitted to academic journals or presented at conferences. Moreover, I only published results, including the as yet unpublished papers in this thesis, where I had explicit permission from the indigenous communities from which I obtained the data.

To ensure the confidentiality and safe storage of the data, I secured all the data with password protections. No data from this research was stored in a cloud-computing environment and data was not shared with any third party. Digital and printed documents in this research, including the audio recordings of the focus group discussion and interviews, were (and continue to be) kept under lock and key and will be destroyed 5 years after the study has been completed.

Importantly, all research participants were asked to sign (and did sign) the informed consent that they were willing to participate in this research project. They were given the time they needed to read the consent form and I also offered to read the consent aloud to the participants if requested. Also, participants were informed that they could stop and withdraw their participation at any time and were free to leave at any time during interviews or focus group sessions. In term of compensation, only the focus group discussion participants in Ottawa received some compensation for their travel expenses.

One element of my thesis involved the task of data mining the posts that were generated and shared on the public Facebook pages of indigenous organizations. Anyone in the world can see these Facebook posts and their comments, whether or not they have Facebook accounts. The expression “data mining” is has an unfortunate semantic association with the act of natural resource extraction, a topic that is understandably very sensitive to all indigenous peoples. In the past and still today, indigenous peoples have been the victims of large mining companies extracting natural resources under indigenous soil and selling it to the world market without consulting them. Furthermore, mining companies have often failed to adequately compensate affected indigenous communities who often had to relocate to other areas because of the pollution in their land, water, and air caused by the mining operations.

I am aware of the exploitative connotation that the expression “data mining” might have for this aspect of my work in this thesis. Therefore, I decided to take the additional step of contacting the Odawa Native Friendship Centre and the Assembly of First Nations as I was analyzing their public Facebook data to identify the risks that urban indigenous youth in Ottawa are facing. This additional step in my process was not required by the University of Ottawa’s Research Ethics Office but I thought it was necessary to demonstrate that I was consulting with the indigenous community in all aspects of my research. At the time of submission of this thesis I decided to put a pause to the publication of the text mining paper (Article 4) until I received official permission and/or feedback from the Odawa Native Friendship Centre and the Assembly of First Nations.

Researcher positionality and reflexivity

I identify as an Asian middle-class man. I was born and received my early education in Thailand (including my post-secondary undergraduate education). I am also an immigrant to Canada and have lived in this country for the past decade. When I lived in Thailand I learned about and witnessed the suffering caused by the colonization of neighbouring countries (such as Burma, Laos and Vietnam) by European countries. Even though these events occurred in the past I can still see its many social, political, and economic consequences in the present.

This experience informs my belief is that the wellbeing of indigenous peoples must always be a priority for the Government of Canada. I believe that now is the time to restore and heal the damage done by the previous governments – provincial and federal – to indigenous peoples. This conviction influenced my research questions and data analysis in this thesis. I view indigenous youth as future citizens who can make real changes for their peoples to live in better conditions and to exercise rights that are equal to those of the dominant population. Indigenous youth especially face a lot of risks and I believe they need support and encouragement to foster hope, even if in the mist of the dark times in their lives.

As an Asian academic, my race, age, and privilege were helpful in collecting data from both indigenous youth and social workers. They were happy to share their thoughts and experiences with me, possibly because I am not visibly part of the European settler population at whose hands they have been suffering since the 16th century. I was gratified to hear personally from some of my research participants that they wanted to become a researcher like me in the future. This validated my hope that the work I was doing would be beneficial to these communities. I believe

that publishing the results of this thesis provides a channel through which the voices and stories of my research participants can be heard.

Chapter 1: INTRODUCTION

Farzindar and Inkpen (2015) describe social computing as “an area of computer science that is concerned with the intersection of social behaviour and computational systems” (p.109). Similarly, Facebook (2016) defines social computing as “computational techniques and tools to study human social behaviour”. Social computing is thus comprised of two essential elements: social behaviour and the computer systems that enable this behaviour. I believe that social behaviour is closely tied to norms of cultural behaviour in specific populations and in this research; I propose to use social computing perspectives to study how urban indigenous youth in Ontario use Facebook during at-risk situations.

UNESCO (2016) defines youth as the population of people ranging from 15 to 35 years of age. Youth, according to that definition, are the most at risk age group in populations across societies and cultures. Transitioning through this stage of life requires them to cope with changes in hormones, physical state, mood, and social behaviour in their exploration of identity and quest for autonomy. Youth in vulnerable and impoverished populations face an even a higher risk since they already have to deal with all those transitional challenges as well as to poverty and vulnerability.

In this research, I focus on urban indigenous youth because they are at risk of suffering from health care, education, housing, unemployment, racial and cultural discrimination, substance addiction, murdered and missing indigenous women, sexual abuse and domestic violence, and youth suicide (Boksa, Joobar, & Kirmayer, 2015; Drache, Fletcher, & Voss, 2016). I choose to further narrow the geographic scope of this study to urban populations in Ontario given that data from Statistics Canada shows that the majority of indigenous peoples in Canada live in Ontario and mostly in urban areas rather than on rural and remote reserves. Census data collected in 2011 indicates that

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out of Canada's total indigenous population of 1.4 Million, 21.5 % (301,425) reside in Ontario (Statistics Canada, 2015a). This amounts to 2.4% of the total population of Ontario as a whole, considerably less than the national percentage of indigenous peoples in Canada, 4.3% (Statistics Canada, 2015b). The percentage of indigenous peoples with registered indigenous status living off-reserve in Canada stands at 50.7% (Statistics Canada, 2015b). Many of them now live in populous urban areas of Ontario such as Toronto, Ottawa, Thunder Bay, Sudbury, Hamilton, and Sault Ste. Marie (Ontario Federation of Indigenous Friendship Centres, 2013).

For this research I chose Ottawa to be the representative of urban cities in Ontario insofar as it resembles other urban centers in which indigenous peoples are living off-reserves. One advantage of having chosen Ottawa is the diversity of indigenous organizations that exist there. Ottawa has several indigenous organizations that look after the basic needs and wellbeing of indigenous peoples who live in the city regarding housing, education, health, and culture. These are all needs that are similar to the ones that the indigenous organizations serve in other cities in Ontario. In addition, Ottawa is a city in which many national-level indigenous organizations have chosen to locate their headquarter offices, including the Assembly of First Nations, Congress of Aboriginal Peoples, Pauktuutit (Inuit Women of Canada), Grand Council of the Crees, and Native Women's Association of Canada. All of these organizations have a common goal: to negotiate and participate in political matters with the Canadian federal government and parliament who are also located in the capital city. The diverse characteristics of indigenous organizations in Ottawa is unique and could help position this research to gather information and record the voices of indigenous peoples that are reflective of both regional and nationwide indigenous communities. At the time of writing

this thesis, there are 15 indigenous organizations located in Ottawa. Of these entities in terms of focus, 9 are policy-oriented and 6 are community outreach organizations.

Ottawa is the capital of Canada and has a population of approximately one million people (City of Ottawa, 2014). It is the seat of Parliament and is the main location of the federal government; it is where important policy decisions are made that have an impact on all indigenous communities across the country. According to 2011 statistics, there are about 18,180 indigenous peoples living in Ottawa (Statistics Canada, 2015c). The number is quickly growing and many of the indigenous peoples in Ottawa are young with 4 in 10 being under the age of 25 (Statistics Canada, 2017). Therefore, Ottawa is a good location for this research since the city attracts indigenous youth from many communities within Ontario and other provinces.

In this research, the term “at risk” is used to identify individuals who face a heightened probability of experiencing physical and/or psychological suffering as compared to the general population. Urban indigenous youth in Ontario are at risk of suicide and depression, imprisonment, sexual abuse, alcoholism, drug use and addiction, food insecurity, HIV and other chronic diseases. In addition to the disadvantageous conditions that this population suffers from, it is also vulnerable to a greater degree of online cyberbullying and racism as well as a higher likelihood of criminality and domestic violence (Rice, Haynes, Royce, & Thompson, 2016; Kral, 2012).

To design appropriate interventions and policies that improve the social realities of urban indigenous youth in Ontario, it is important for indigenous communities, social workers, and governments to be able to quickly identify members of the population who are at imminent risk (i.e. those people who, at this moment, are likely to be in danger). My thesis is driven by the hypothesis that the application of text and data-mining techniques on Facebook posts could be

used to both gather real-time and trusted data to detect urban indigenous youth at risk. If this hypothesis is true, then such information could also play a role in intervention by adapting Facebook's News Feed algorithm to address the needs of these populations.

Statement of the problem

Indigenous youth in Canada have a much higher likelihood of being in either physical and/or psychological need than other population groups in the same age range, particularly in terms of suicide prevention. Youth suicide is a serious epidemic in all indigenous communities, be they in remote, rural, or urban areas. The indigenous youth suicide rate is five to seven times higher than that of non-indigenous Canadians (Barker, Goodman, & Debeck, 2017). Long-term and cultural sensitivity programs of suicide prevention and rehabilitation are urgently needed (Fraser, Geoffroy, Chachamovich, & Kirmayer, 2015).

However, help for indigenous youth at risk frequently arrives too late: it often takes too long for family, friends, community, and governments to identify the indigenous youth who are at risk. This problem even occurs within the government-run hospitals where it is not permitted to record and track patient ethnicity in order to protect individuals' privacy and ensure health equity and fairness for all citizens. Ironically, this health record management practice poses a serious challenge for healthcare providers and public health officers to accurately characterize the current state of indigenous youth suicide (Tait, Butt, Henry, & Bland, 2017).

Another problem is that it takes some time for anyone voluntarily seeking help to inform their closely connected family and friends about their at-risk situations. In general, gender is a factor that can help predict whether a young person is more likely or less likely to seek professional

mental health care. Depressed male adolescents are more unwilling to seek out psychological and medical treatments than female teens (Fortune & Hawton, 2005). Unfortunately, indigenous youth and teenagers from ethnically minority backgrounds are found to be the most reluctant to voluntarily seek medical care when they are coping with depression and associated suicidal thoughts (Rickwood, Deane, & Wilson, 2007). Besides these barriers, some conditions are associated with social stigmas especially drug addiction, disability, and poverty. The delayed identification of indigenous youth at risk poses great challenges to health care providers for how to provide assistance and treatment.

Purposes of the study

- i. To determine whether Facebook is an effective tool to identify and assist urban indigenous youth at risk in Ontario.

This research aims to use Facebook as a tool to identify and assist urban indigenous youth in Ontario who feel or are at risk. Facebook usage data could be used to identify risks based on both explicit and hidden patterns in urban indigenous youth and indigenous organizations' Facebook activities.

- ii. To explore enabling Facebook's News Feed algorithm to bias the news items and Facebook posts of urban indigenous youth at risk in Ontario to provide helpful news items and positive posts from their Friends' walls.

This research aims to ascertain whether manipulating the bias of Facebook's News Feed algorithm would help urban indigenous youth at risk to develop a greater sense of optimism and foster a greater degree of inclusiveness within their communities.

Research questions

- i. How are indigenous organizations using Facebook to connect with youth at risk?
- ii. How are urban indigenous youth expressing themselves on Facebook when they feel or are at risk?
- iii. In what ways can the text mining of indigenous organizations' Facebook data identify the risks among urban indigenous youth and at-risk individuals?
- iv. How can the findings from the research question # 1, # 2, and # 3 be adapted to enable Facebook's News Feed algorithm to address the needs of urban indigenous youth at risk?

Glossary

- Social media vs. Social networking

The expressions “social media” and “social networking” are often used interchangeably, especially in the non-academic context, even though they each have their own distinctive definitions. Social media refers to the computer Web 2.0 functionalities relating to the concept of user generated content (Obar & Wildman, 2015) and social networking is about how people use the social media tools to communicate and engage with other social media users to build their online communities (Subrahmanyam, Reich, Waechter, & Espinoza, 2008). There are various types of social media including social networks, micro-blogging, online forums, online bookmarking, wikis, social news, and media sharing (Farzindar & Inkpen, 2015). This research project will use the term “social media” since it better covers the research activities in this project.

- Indigenous peoples terminology

There is no standard terminology to refer to indigenous peoples. The key names that we use in this proposal to refer to indigenous peoples in Canada are “indigenous”, “aboriginal”, “first nations”, “Inuit”, and “Métis” (First Nations and Indigenous Studies, University of British Columbia, 2009). However, there are also many other specific groups of indigenous peoples in Canada, each with their own unique name, culture, and territory. This research project does not make specific reference specific indigenous peoples in Canada. Rather, the project uses the word “indigenous” throughout. The term is widely used by indigenous scholars who pay respect to indigenous peoples especially the ones in Canada.

Theoretical framework

Ling et al. (2015, p. 199) describe information and communications technology (ICT)-enabled community empowerment by specifically looking at the roles of social media in responding to the community at risk, which the authors define as follows, “social media has three roles in enabling communities to attain collective participation, share identification, and collaborative control”. This research will measure these three factors. The ICT-enabled community empowerment theory (Ling et al. 2015) was created from their field research in Thailand during the 2011 flooding disaster. At that time, people in Thailand had a lack of trust in traditional media and in their own government to provide accurate information about the flooding. They turned to social media for reliable news, which was reported by ordinary people who were living in the affected areas. Several online social media community groups were formed to share and exchange information about the flooding. They also extended their online communications to mobilize people to help with the government’s risk management teams. The social media groups were able to recruit volunteers and collect donations

to give to families who had to be evacuated from their own homes to live in the shelters provided by the government.

Some recent academic studies build upon Ling's ICT-enable community empowerment theory. In their literature review paper on e-government and social media, Wang, Medaglia, & Sæbø (2015) state that the Ling's theory was the only article that discusses the value of social media in community empowerment and in the public sector context. A study by Medaglia & Zheng (2016) also indicates that the research by Ling was the only study in information systems that looked at the public sector and citizen empowerment during at risk situations.

Another study by Dufty (2012) proposes a theory related to the role of social media in community empowerment and resilience during disasters. Dufty (2012) suggests a framework that indicates social media can assist communities to build risk resilience based on three elements: risk reduction; emergency management; and community development. The theory of Dufty (2012) is different from that of Ling in that Dufty's theory focuses on the goals of using social media in response to disaster situations and identifies how social media can be applied to improve the well-beings of the communities such as informing others about the risk, managing tasks, and conducting post-risk events. But Ling's theory looks at social media system functionalities in the context of community risk management such as shared identification, collective participation, and collective control, all factors which empower communities at risk in terms of their structural, psychological and resource aspects. Therefore, the theory put forward by Ling is all the more relevant to apply in this research.

Figure 1 (below) from Ling's theory shows the role of social media in community empowerment by helping social media users to attain shared identification, collective participation, and collaborative control.

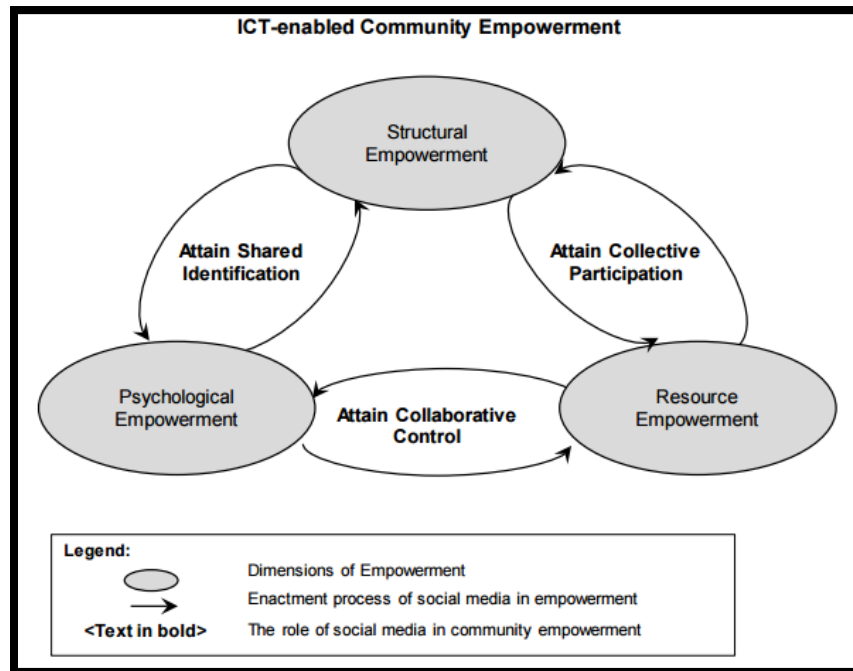


Figure 1: Ling et al. (2015)'s ICT-enabled community empowerment theory

The role of attaining shared identification occurs when social media connects to the group of people who are facing similar problems or share the same opinions about something. Social media enables users to form a sense of togetherness and closeness. This use of social media nurtures the unique identity formation of the group. Collective participation means that when people use social media, they systematically contribute to social media activities, even if they are not always actively posting, sharing, commenting on their own social media accounts or someone else's account. In the case of more passive social media users, they still receive updates and notifications from other

users' social media activities on their own accounts, but are less proactive about posting their own updates. The term collaboration control refers to when social media users who share the same interest belong to the same online group. They will start to interact with each other within their own social media group, leading to future offline or online actions, which are going to require them to collaboratively control and contribute to the tasks.

Beyond the three characteristics of social media in community empowerment explained above, each element can be linked with another social media function. First, the role of social media in achieving shared identification can help to empower communities to overcome both structural and psychological challenges. Structural empowerment refers to how social media enables reaching out to people who live in different locations to participate and follow the group's agenda. It changes the existing community social and power structure in that social media can now recruit people from various zones or areas who share the same beliefs and identities. Social media thus can empower communities to overcome psychological challenges by allowing people to freely express their thoughts. Tapping social media is thus crucial for empowering communities that usually are voiceless and vulnerable.

The second role of social media is to enable collective participation, which can empower communities with structural and resource constraints. Structural empowerment in this case refers to the situation when the communities in crises can use social media in order to act more proactively to collectively solve their problems. In the past, government and aid organizations were seen as the only principal risk responders and communities had to wait for them to act and intervene. But with social media, communities are empowered to be more involved in risk management. Social media users can engage in risk management by sending and sharing

information to other people, which will increase the number of people involved in solving the community crises. Next is the resource empowerment generated by collective participation in social media. In this context, “resource” means the information that is generated through social media activities.

This information becomes an extremely valuable resource because it can be trusted and is more accurate than the information that governments and authorities have provided them in the past - information was not accurate and typically contained some hidden political agendas.

Lastly, social media plays an important role in providing collaborative control which empowers the communities’ psychological and resource capabilities. The psychological empowerment referred to in this element arises when people collaboratively control and are involved in their community risk-management and when their social media actions raise the community’s self-esteem. They will be more confident in their own competence in managing the risk. It is very important for communities to be self-reliant and cultivate pride in their communities. Furthermore, the resource empowerment is seen as the ability of communities to be able to control how they manage material and human resources such as volunteers and members with special skills and expertise to help in certain tasks. It creates a grassroots movement.

These factors in Ling’s theory are important in this research because they can very be applied to urban indigenous youth and their communities in Ontario. Using Ling’s theory in this context can guide a pilot study to identify indigenous youth in Ontario according to their use of social media. Furthermore, Ling’s theory discusses untrusted communication between the authorities and communities in risk situations. This element is applicable to the real situation of indigenous peoples in Canada based on their past experiences with the government.

FACEBOOK USAGE AMONG URBAN INDIGENOUS YOUTH AT RISK IN ONTARIO

This research attempts to apply Ling's theory to social media community empowerment, in particular with urban indigenous youth at risk in Ontario, who are not the dominant population. This is different application of Ling's theory in that they did their fieldwork with the non-indigenous communities in Thailand who have a different culture, history, and social structure from indigenous peoples in Canada. In terms of the community risk being different, the prototype theory used research findings from the natural flooding to build their theory. However, in this research, urban indigenous youth at risk in Ontario are facing many different challenges. The Ling's theory will be modified to suit the real challenges that urban indigenous youth in Ontario are facing.

Chapter 2: RESEARCH METHODOLOGY

The empirical research done for this thesis consisted of collecting data to test the Ling's ICT-enabled community empowerment theory, as previously explained, and investigate whether the theory can be applied specifically to the situations of urban indigenous youth in Ontario. Ling et al.'s theory was devised to account for both field research data and social media data of community groups and to explain how ordinary people interact with social media during crisis response and recovery. Community participation in research was a strong element in Ling et al.'s theory. The authors used qualitative methods namely interviews and focus group discussions to record the voices of people affected by floods, volunteers, and community leaders, and then integrated the fieldwork data with the social media data collected from Facebook, Twitter, and YouTube.

The research methodology employed in this thesis is inspired by Ling's research. I used similar qualitative data collection methods and I also conducted one-on-one interviews with communication managers and youth social workers in Ottawa and ran focus-group discussions with urban indigenous youth. However, unlike the field studies by Ling et al. I conducted a survey to obtain demographic data, assessed personal social media usage behavior of the participants in my focus groups, and evaluated the extent to which they had access to technology. While Ling's research analyzed and categorized the contents of social media posts manually and looked at several social media platforms, my social media analysis was done automatically by the SAS text-mining software and my thesis investigated public data only from Facebook. In conclusion, the work done for this thesis applied a mixed methods approach whereas the Ling et al.'s theory was mainly designed to account for qualitative data.

Research design

The use of mixed-methods for data collection allows researchers to conduct and analyze both quantitative and quantitative data. Mixed-methods have been commonly applied to the study of community health issues and the study of marginalized populations (Hodgkin, 2008; Chow, Quine, & Li, 2010; Mertens, 2012). Findings of mixed-methods research have also been used to enhance social justice and human rights (Creswell, 2014).

I collected qualitative data by conducting interviews and focus-group discussions. For the quantitative data collection, I intended to gather and analyse the Facebook usage data of indigenous community organizations to discover their Facebook usage patterns with text mining techniques using the SAS Visual Analytics application. Before the focus group discussions began, all participants were asked to answer a survey questionnaire seeking information related to his or her demographic and personal Facebook usage behaviour.

During my field work, I received assistance from the communication mangers and youth social workers whom I interviewed for the second article, “Connecting with youth at risk: Indigenous organizations use of Facebook”. They kindly assisted me with recruiting focus-group discussion participants for my third article, “Facebook usage among urban indigenous youth at risk”, who were indigenous youths living in Ottawa. I had one group of research participants assist me to recruit another group of participants. This snowball sampling technique was very effective particularly since my project aimed at gathering voices from difficult-to-access populations. Urban indigenous youth in Ottawa who participated in my research project are hard to recruit for most researchers, but they have a great trust in the social workers who helped me in this research project.

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As a result, they enthusiastically participated in my research project. It was something I could not easily have done on my own in a short timeframe.

The results from this research, if they were deployed by Facebook and other social media platforms, could be used to improve indigenous community's lives by detecting youth who are at risk physically and/or psychologically and enable Facebook to adapt its News Feeds to bias the Facebook walls of the youth at risk with items such as positive posts found in their own cycle of Facebook friends' accounts and targeted news and advertising that can improve social outcomes for these populations. This research could contribute to the welfare of indigenous communities.

Currently, there is a paucity of empirical academic studies in the area of social computing at the intersection of Facebook use and indigenous peoples. This research consists of fieldwork and contributes to identifying specifically how urban indigenous youth interact and communicate through social media and how these interactions differ from those of the dominant population; expanding social media's research on social computing, text mining, and computer human interaction; social media research in the area of positive social change and equality for minority and vulnerable populations; and helping to improve communications and understanding between indigenous peoples and social workers, governments, NGOs, international institutes by using social media data to better understand the risks facing among urban indigenous youth.

Data collection: Qualitative

The qualitative data collection methods employed in this research was obtained from interviews and focus-group discussions.

- Interviews

I conducted interviews with the communication managers or youth workers who are responsible for social media campaigns in the indigenous organizations in Ottawa and whose social media activities are followed by many people in their communities (*See the Appendix E for the list of the potential indigenous organizations in Ottawa*). These semi-structured interviews aimed to discover their Facebook strategies and practises and used explicit interview guidelines. This allowed interviewees to freely express their own opinions and add their own additional comments beyond the prepared questions (*See the Appendix A for the interview guideline*). The interviews were audio-recorded and were performed in-person.

- Focus group discussions

In the focus-group discussions, the participants, indigenous youth aged 14-35, were asked about how they use Facebook to voice their lived experiences when they are risk. Participants must agree to self-identify that they belong to one from among the indigenous titles listed in the Indian Act of Canada including First Nations (both status and non-status First nations), Inuit, and Métis. All participants in these focus-group discussions must have been living in Ottawa more than one year and must be current Facebook users. A focus-group question guide provided a structure for the flow of discussions (*See the Appendix B for the focus group discussions' question guide*), and the discussions were audio-recorded with the permission of the participants. The data generated from

the focus group discussions, like the data from the interviews were then transcribed and coded based on a thematic analysis.

Data collection: Quantitative

The quantitative data collection aimed to gather enough Facebook data to generate numerical and statistically significant explanations. This social media data was used to analyse the patterns of Facebook usage and trends among indigenous communities and the demographic data of urban indigenous youth in Ottawa.

- Survey questionnaires

The structured survey questionnaires contained both closed and open-ended questions focusing on demographics, personal social media objectives and practices among the focus group discussion participants. Every focus group participant was asked to answer the survey questionnaires before the focus group discussions began (*See the Appendix C for the survey questionnaires form*).

- Text mining

Text mining techniques and principles are flourishing in the Computer Sciences and have been applied to many areas including health, business, and social sciences. Text mining helps us to learn about the hidden and obvious patterns in the datasets in order to predict future outcomes. This text mining analytics process is based on various calculation techniques such as clustering, classification, etc.

This research used these text mining techniques to analyse Facebook wall posts in sample indigenous organizations from Ottawa. The representative for indigenous organizations in Ottawa were the Odawa Native Friendship Centre since the focus of their work is to help indigenous

peoples living in Ottawa. At the national level, the Assembly of First Nations was chosen because their mandate is to unite all indigenous peoples across Canada to collectively negotiate with the Canadian government. Their Facebook content covers the nationwide interests of all groups of indigenous communities whereas the Odawa Native Friendship Centre have more local context. I anticipated that there could be some interesting comparisons to be made between local-to-local interactions among indigenous peoples and local to national indigenous organization. (*See the Appendix D for indigenous organizations' Facebook details*).

The mining of this data aims to discover topic trends that the selected indigenous organizations in Ottawa are generating and sharing content on their Facebook accounts. Studying the Facebook topic trends can be viewed as a way of listening to the indigenous peoples and their organizations and of reflecting on the social realities that they are now facing, including their demands for change. The purpose of the text mining in this research is to measure whether Facebook could be used as a tool to identify the risks facing among urban indigenous youth in Ottawa.

Data analysis: Qualitative

The initial analysis was done with data collected from the interviews and focus group discussions. Data was manually transcribed in English. No personally identifiable information such names, addresses, and physical appearances were collected or recorded. The predetermined themes that were used for the thematic analysis of the data were: personal agency, cyberbullying, racism, indigenous identity, alcohol and substance misuse, unhealthy behaviours, domestic violence, suicide among indigenous youth, indigenous organizations, and the use of Facebook. We will also seek emergent themes from the data. No data from this research were stored online in a cloud

computing environment and conform to the University of Ottawa's data management planning policies.¹

Data analysis: Quantitative

The second form of data analysis was done with the results from the survey questionnaires. All answers were calculated into numeric values by assigning each answer a number and comparing answers based on the demographic of responders. The basic data analysis from the survey questionnaires were discussed as well concerning what the data is revealing overall and the mean or percentage of the numbers. No descriptive statistics tool was used because our data sets are not large.

The third form of data analysis is the text mining of the data from Facebook wall posts from the Odawa Native Friendship Centre and the Assembly of First Nations. Their Facebook data are already available publicly. The SAS Visual Analytics application version 8.2 was used to abstract and download the wall post data and to perform text mining analysis with clustering techniques to find the main themes to draw some conclusions about the hidden patterns between these Facebook posts. They will be linked to the potential trends of indigenous community risks. Moreover, some data will be collected manually and some basic calculations were made to determine some basic information such as the number of people who liked the Facebook page, the frequency of posting, the number of posts with pictures and videos, the number of comments, and number of sharing. No personally identifiable information about people who comment, follow, and like the sample Facebook accounts was used or mentioned in this research.

¹ <https://biblio.uottawa.ca/en/services/faculty/research-data-management/data-management-planning>

Jick (1979) has shown that the methodological triangulation of different qualitative and quantitative techniques applied is beneficial, especially when integrating and analyzing the findings. The mixed methods represent a more complete usage of the data across themes and fields to assess complex problems. Comparing multiple data sets side by side enables the creation of an integrated view of the datasets that enables research questions to be answered more definitively and to draw more solid conclusions. This research project obtained data from communication managers, youth social workers, indigenous youth, social media users, and indigenous organizations' Facebook pages to learn how urban indigenous youths in Ottawa interact with Facebook during at-risk situations. The rich data of this research project represented both the experience of individuals and indigenous communities. Therefore, research outcomes of this mixed methods study was able to provide complete understanding of the topic through multiple lenses.

Chapter 3: ARTICLE 1

Indigenous peoples, Social media, and the digital divide:

A systematic literature review

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This article published (volume 42, no.3, 2018) in
the American Indian Culture and Research Journal.

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Abstract

This paper examines peer-reviewed publications studying the use of social media by indigenous peoples in relation to the digital divide. Five themes were identified within the rubric of the digital divide that indigenous peoples are facing with social media: 1. Remote and rural; 2. Low socioeconomic status; 3. Hardware and software; 4. Digital content; and 5. Age and culture. Moreover, there are four primary objectives for which indigenous peoples use social media: 1. Cyber-activism; 2. Digital archives to preserve and promote their culture; 3. Connecting and maintaining relationships with other peoples; and 4. Health education and virtual health support groups.

KEYWORDS: social media; indigenous peoples; digital divide; systematic literature review

Introduction

The past decade has seen a significant increase in the use of social media platforms such as Facebook and Twitter, which has coincided with its global adoption as a form of entertainment and social interaction (Farzindar & Inkpen, 2015). The political impact of social media can be seen in the multiple social movements (e.g. Arab Spring and Idle No More) that have resulted from their ability to mobilize people to social action (Harp, Bachmann, & Guo, 2012). Social media platforms have also increasingly been integrated into many aspects of peoples' daily activities, as a result of the ubiquity of applications on mobile devices (Mihailidis, 2014). Businesses and governments, not to mention presidents and prime ministers, have also turned to social media both to disseminate information and to learn about the target behaviours of online and offline end-users, based on the information that they like, share, or comment on.

The goal of this paper is to examine what the scholarly literature says regarding how indigenous peoples around the world, including the indigenous peoples of USA and Canada, are using social media and to determine from that literature what role technology access barriers, attitudes, skills, and usage types—all characteristics of one definition of the “digital divide” (Van Deursen & Van Dijk, 2014) —play in accounting for that usage. Some elements of the literature address the question of whether computer access and connectivity issues faced by indigenous peoples affect their use of social media. A better understanding of the conditions that exacerbate the digital divide could therefore have a significant impact on the well-being of indigenous populations who use social media to mobilize their causes into action.

Some previous studies on the use of technologies by indigenous peoples state that indigenous peoples have always successfully capitalized on available technologies to do the things they do.

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Murphy (1981) and S. Murphy (1981) explain the 150-year history between 1828-1978 of the American Indian press and the contemporary indigenous media development from print into electronic outlets. They argue that indigenous peoples have always been trying their best to take advantage of technologies. Even though it is not an entirely pleasant experience, historically non-indigenous press often reported inaccurate information about indigenous peoples. Keith (1995) describes the rise of tribally sponsored broadcasting and indigenous programming in commercial radio and television in USA and Raudsepp (1985) similarly addresses the indigenous press in Canada. These two authors claim that the indigenous press help to reduce information gaps and prevent misinformation about indigenous society and culture among non-indigenous peoples.

More recently, indigenous individuals and organizations have investigated the ways in which indigenous communities are affected by and also employed social media for various purposes, including raising public awareness. Carlson et al. (2017) for example, explore the ways in which Indigenous Australians used social media to engender a solidarity response from Indigenous Australians to counteract stereotypes of indigenous peoples propagated by Australian media. The authors refer to the leaked video footage and photos incident of indigenous youth being held in the Don Dale Youth Detention Centre in Darwin, Australia, when they were being tortured with tear-gas, handcuffed, hooded, strapped to a chair, and stripped naked. The images were quickly shared on Facebook, Instagram, and Twitter. The situation got worse when the Australian newspaper reacted to the youth detention incident by publishing a cartoon of an indigenous boy being returned by an officer to his alcoholic father. The cartoon was widely shared on social media with many racist comments looking down at indigenous parents. In response to the situation, an indigenous father decided to tweet an image of himself with his children to show how proud he is to be an indigenous father with the hashtag, #IndigenousDads. Promptly, the hashtag became a powerful

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public awareness-raising movement for other indigenous Australians. Many indigenous males participated in the social media campaign and some of them paid tribute to their fathers and grandfathers in their posts (Bogle, 2016). This real-world example demonstrates that social media can be used to combat negative stereotypes of indigenous peoples in media representation and to contribute to what the authors called a “shared recognition” of the collective indignation by indigenous people of such stereotypic representation. Social media creates a space where indigenous peoples can speak to the public asking for positive social shifts, to reinforce pride in indigenous identity and furthermore to build resilience and community capacity to help and support their own peoples (Carlson & Frazer, 2018).

Another recent concrete example of social media utilization of indigenous organizations is the 2018 National Congress of American Indians. The event organizer came up with a social media campaign using the hashtag #SOIN2018, which stands for the State of Indian Nations. The Congress’s goals are to increase engagement and raise awareness between tribal nations, the US Government and the American public (National Congress of American Indians, 2018). The opportunities for success and advancement of Native peoples, and priorities to advance our nation-to-nation relationship with the United States. The event speeches were broadcasted live on the Internet and archived on the website. The audience was being encouraged to share information about the event found on the organization’s official Facebook, Twitter, and Instagram accounts. People shared their thoughts on personal social media platforms using the same hashtag #SOIN2018. During the event, audiences in the meeting room and at home were asked to share photos with a few short messages mentioning that they were watching the live broadcast of the National Congress of American Indians. This social media campaign was an excellent opportunity

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to share information and educate both indigenous and non-indigenous peoples about the work of the State of Indian Nations.

The literature review in this paper aims to include various disciplinary perspectives from indigenous peoples and communities in USA, Canada, Australia, New Zealand, and other countries, as well as media and technology studies for indigenous communities, peoples, and organizations. Furthermore, this systematic literature review is also motivated by the Federal Communications Commission's 2018 Broadband Deployment Report. It states that from 2012 to 2014 there were 1 million people on rural Tribal lands in the USA that were able to obtain fixed terrestrial broadband Internet access after the *Title II Order*. But between 2015 and 2016, deployment dropped dramatically, reaching only 330,000 people on Tribal lands (Federal Communications Commission, 2018). It shows that the inequity of access to technologies experienced by indigenous peoples still clearly exists.

Research methodology

The systematic literature review method has its origins in the Cochrane systematic review method in the field of medicine. This method was designed for evaluating and interpreting the literature on evidence-based human health care and has since been applied to other disciplines including social science fields in academic areas including criminology, disability studies, education, international development, knowledge translation, nutrition, and social welfare. Systematic reviews in social science generally aim to develop evidence-based policy and practice (Campbell Collaboration, 2018). This method is chosen because it is a transparent, reproducible and neutral method. It has a specific methodology for locating, selecting, evaluating, and reporting studies. Producing a systematic review requires the formulation of review questions at an early

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stage (Denyer & Tranfield, 2009) and the assessment of the studies quality is crucial in order to determining whether the studies are relevant to the review questions (Petticrew & Roberts, 2008)

These principles differentiate systematic review from other literature review methods.

My systematic review was limited to peer-reviewed articles indexed in the academic databases Scopus, ProQuest and JSTOR. I chose to review only peer-reviewed articles because in academia they are valued as the works with the highest standards of quality and credibility evaluated by a community of experts. Another limitation is the format of the reviewed publications. Government documents, scientific and social scientific studies, essays, technical reports, conference proceedings, books, and theses were not included in the selected databases and therefore not included in my sample set. Naturally, these limitations preclude many valid sources of information.

For this transdisciplinary systematic review, I harvested three academic databases: Scopus, ProQuest and JSTOR. Regarding to the content coverage, Scopus covers more of the science and engineering literature while ProQuest and JSTOR have a greater number of social science and humanities journals. This review needs to search literature across many disciplinary boundaries.

I performed full-text searches in all three selected databases on the same day using the same search strings.² I conducted the search as a full-text search rather than limiting the search to metadata fields such as the title, keywords and abstract. Searching the full-text has the advantage that any document containing the search terms will be retrieved, thus not missing a potentially relevant study, i.e. it maximizes *recall*. The disadvantage is a loss in *precision*: some documents may be

² (indigenous OR aboriginal OR "First Nations" OR Inuit OR Métis) AND ("social media" OR "social networking" OR Facebook OR Twitter OR YouTube) AND "digital divide", performed on February 19, 2016

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retrieved that contain the keywords but may occur in the full text incidentally and are not directly relevant to the research question (Manning, Raghavan, & Schütze, 2008). Increasing recall thus required a more elaborate human filtering process to eliminate irrelevant papers in which the terms searched were merely mentioned, but not relevantly.

The search expression was designed around three main concepts: “indigenous peoples”, “social media” and “digital divide”. While the word “indigenous” is used throughout this paper as it is now the preferred term in academic writing, particularly about indigenous peoples in Canada and internationally (Native American and Indigenous Studies Association, 2018), it was also necessary to include the term “aboriginal” in order to not miss potentially relevant studies. To ensure that studies concerning Canadian indigenous communities were included, I also used the terms “First Nations” “Inuit” and “Métis” but not the names of specific peoples (Cree, Mi'kmaq, Algonquin etc.). Thus all the principal synonyms of indigenous peoples in Canada (First Nations and Indigenous Studies, University of British Columbia, 2009) occur in the first part of the search term. Another limitation is that this review only searched for primary studies written in English. In fact, there are many countries in South America and Africa that have a large number of indigenous populations that were colonized by non-English speaking countries. This review therefore does not include the studies that have been written in French or Spanish that address the question of social media among indigenous peoples in South America and Africa.

In addition, some academic journals such as American Indian and Alaskan Native Mental Health Research, Journal of the Native American and Indigenous Studies Association, and Decolonization: Indigeneity, Education & Society are not indexed by Scopus, ProQuest, and JSTOR, which are the data sources for this review. The methodology for selecting articles for this

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review therefore missed these studies from these sources. However, I performed a manual search using all these terms on those journals from their web sites' search engines and the University of Ottawa online library portal. These searches came up with no other relevant results. Yet, many other core scholarly journals in indigenous studies including American Indian Culture and Research Journal, American Indian Quarterly, Ethnic & Racial Studies, Journal of American Indian Education, Studies in American Indian Literatures, and American Indian Law Review that are indexed by Scopus, ProQuest, and JSTOR. The studies in those journals that meet the qualifying criteria were included in this review.

The second concept referred to by the string "social media", is often used synonymously with "social networking" and includes popular tools such as Facebook, Twitter, and YouTube. Even though the terms "social networking" and "social media" are often used interchangeably, especially in non-academic contexts, each has its own distinct definition. Social media refers to Web 2.0 functionalities relating to user generated content (Obar & Wildman, 2015), and social networking is about how people use social media tools to communicate and engage with other users to build online communities (Subrahmanyam et al., 2008). There are various types of social media including social networks, micro-blogging, online forums, online bookmarking, wikis, social news, and media sharing (Farzindar & Inkpen, 2015).

The third concept is referenced by the search string "digital divide". Van Dijk (2006) defines the digital divide as the technology access gaps between a certain demographic and other population groups. Research by Haight, Quan-Haase, and Corbett (2014) states that the digital divide (particularly internet access) exists as a function of the individual's income, education, rural or urban residential zone, immigration status, and age. Since these demographic factors could have

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had an influence on access to the Internet and social media for many indigenous peoples in USA, Canada, and elsewhere. Other researchers who duplicate my methodological approach used in this review have to be aware of the terminology used in the current discussion of the digital divide. In this review, I refer to the digital divide as the economic and social barriers which create unequal access to computers and the Internet. However, other researchers now like to use more precise phrases such as “spectrum sensing” or “technology adoption” in their research on the digital divide. Those precise terms were not used in this systematic review.

The criteria for selecting the primary studies to be included in the sample and subsequently analyzed included:

Type of publication: The studies must have been published in peer-reviewed journals or conference proceedings. The content also had to be available in full-text. The criterion of peer-review offers some level of quality control, as does the fact that they are indexed in Scopus, ProQuest and JSTOR. Their availability in full-text guarantees that the indexing and retrieval process covers all the terms in the articles, not just in the metadata fields.

Date of publication: The studies must have been published between January 2004 and May 2018. The date of publication constraint is based on the fact that Twitter started in 2006, YouTube in 2005, and Facebook in 2004. Twitter and Facebook being the most common international social media tools.

Relevance to the research questions: The studies must be relevant to the research questions. Queries in a search engine only retrieve documents that contain the terms in the query but the presence of a term or even a combination of terms is not a sufficient condition for the relevance of the study to the research questions. It could be that the terms occurred, for example, only in the

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bibliography of a study and not in the study itself. The relevance of a document had to be evaluated by a human reviewer.

Language: The studies must have been written in English. While some scholarly literature is available in other languages, particularly in French, where it concerns indigenous peoples in Africa and Quebec, the dominant language in the scholarly literature is still English. This was confirmed by executing a French translation of the English search expression mentioned above, which produced no results in either Scopus or JSTOR and only two in ProQuest, neither of which met the other criteria.

Subject: No constraint. Studies could come from any academic discipline. The absence of disciplinary constraints ensured that the search expression would retrieve as many relevant articles as possible (maximum recall). Furthermore, since research on this question spans multiple disciplines, including Social Sciences, Computer Science, Human Behaviour and Media Studies, restricting the search to specific disciplinary categories seemed arbitrary.

Duplicates: If the searches on Scopus, JSTOR and ProQuest produced duplicate results only one document was counted.

Included and excluded studies

The table below (Table 1) provides a summary of the search results and the number of studies that met the criteria. I found 156 papers matching the search criteria. The numbers of papers identified by my search during that the sample period shown in the timeline (Figure 1) show that there was a gradual increase in the number of studies relating to the use of social media by indigenous peoples between 2011 and 2015 with a spike in publications in 2014.

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Data Sources	Number of Studies retrieved by Search String	Number of Studies Fitting with Selection Criteria
Scopus (A full-text search performed on February 19, 2016.)	157	64
ProQuest (A full-text search performed on February 19, 2016.)	1,115	68 (Twelve duplicated studies have been taken out as they already presented in the SCOPUS and JSTOR search results in this review.)
JSTOR (A full-text search performed on February 19, 2016.)	39	24 (One duplicated study has been taken out as it already presented in the SCOPUS search results in this review.)
Total	1, 311	156

Table 1: Studies identified by the search strings and selection criteria

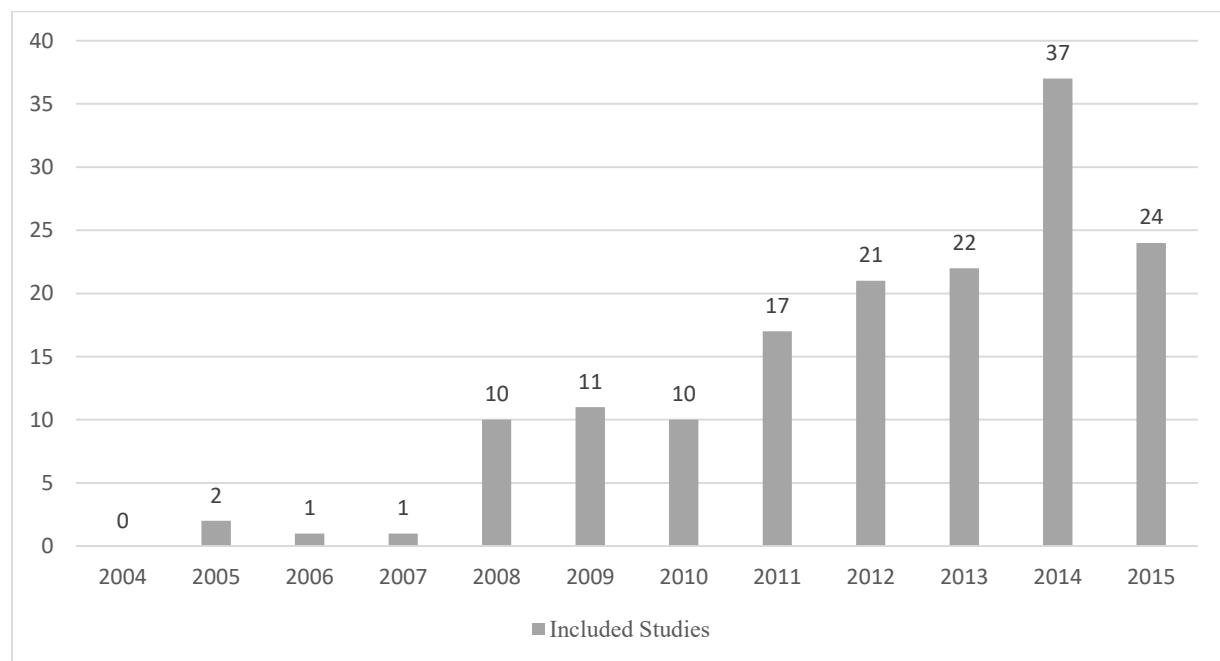


Figure 1: Publication years timeline of included studies

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I reviewed the studies as follows: 157 results matching the search string in Scopus were reduced to 64; in the ProQuest database 1,115 results were limited to 68; and in JSTOR 39 results were cut down to 24 because they were in the wrong time period (before 2004 / after 2015), were in another language besides English, and presented in the wrong publication type (such as books, newspaper articles, and magazines). Afterwards, I read the remaining studies to determine on their relevance. Some examples of categories of irrelevant articles that were eliminated include mobile technology development, ICT in education in Africa, social media among immigrants, social media usage among non-indigenous youth, e-government services, health education, digital inequalities among African-Americans, and human rights. After completing a review of all the retrieved studies, I identified 29 studies answering the review criteria. The disciplinary basis represented in the 29 peer-reviewed articles consisted of 21 articles from the social science and humanities, which are mainly from communication, information and media studies, political science, and geography. There are 8 articles from the science and engineering disciplines with a focus on human-computer interaction, information technologies, and health sciences.

Supplementary Searches

Following constructive feedback from reviewers I conducted a second search with more inclusive search strings that included near-synonyms for the concept of "digital divide" such as "social inequality", "economic inequality", "digital split", and "digital gap".³ This search yielded a slightly larger set of overall results but added no more relevant papers than the original 29 studies

³ (indigenous OR aboriginal OR "First Nations" OR Inuit OR Métis) AND ("social media" OR "social networking" OR Facebook OR Twitter OR YouTube) AND ("digital divide" OR "social inequality" OR "economic inequality" OR "digital split" OR "digital gap")

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that responded to the research questions. However, this new search yielded 18 studies, which further corroborate the findings in the initial collection.

A third additional search was conducted in May, 2018 with a search string that included the various terms for indigenous peoples in the United States such as “Native American”, “American Indian”, and “Alaska Native”.⁴ This supplementary search was added to locate peer-reviewed articles published until May 2018. It yielded 20 new studies. In total, the two supplementary searches yielded a further 38 studies that provide corroborating evidence to support the findings in the 29 main studies.

Results

Principle findings: Digital divide

I read all the articles and listed all the themes and then clustered them together according to thematic similarity. My method for identifying themes was driven by a top down thematic analysis. I wanted to answer the following questions: 1. Does the literature indicate a relationship between the digital divide and *geography*? 2. Does the literature indicate a relationship between the digital divide and *socio economic status*? 3. Does the literature indicate a relationship between the digital divide and the *availability of hardware and software*? My review of this literature identified five themes within the rubric of the digital divide that indigenous peoples are facing: 1. Remote and Rural; 2. Low Socio-Economic Status; 3. Hardware and Software; 4. Digital Content; and 5. Age and Culture.

⁴ (indigenous OR aboriginal OR “First Nations” OR Inuit OR Métis OR “Native American” OR “American Indian” OR “Alaska Native”) AND (“social media” OR “social networking” OR Facebook OR Twitter OR YouTube) AND (“digital divide” OR “social inequality” OR “economic inequality” OR “digital split” OR “digital gap”)

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1. Remote and rural

Many indigenous peoples currently reside in remote and rural geographic locations. According to the Canada 2011 Census, 44 percent of indigenous people live in remote and rural areas (Indigenous and Northern Affairs Canada, 2016). In 2011, the provinces with largest indigenous populations were Ontario, Manitoba, Saskatchewan, Alberta, and British Columbia (Statistics Canada, 2016a). Those remote and rural regions often have extreme climates and fewer natural resources. The colonizers called the new areas for indigenous peoples “reserves”, numbering more than 3,100 (Statistics Canada, 2016b). Twelve papers in the sample identified this issue (Singleton, et al., 2009; Gauvin, Granger, & Lorthiois, 2015; Filippi et al., 2013; Ormond-parker & Sloggett, 2012; McMahon, Gurstein, Beaton, O'Donnell, & Whiteduck, 2014; Harp, Bachmann, & Guo, 2012; Kopacz & Lawton, 2011; McMahon, 2014; Watson, 2015; Harrison, 2014; Evers, Albury, Byron, & Crawford, 2013; Middleton & Crow, 2008).

The study by Singleton et al. (2009) states that for many indigenous communities in Australia, remoteness and isolation is a major contributor to digital divide problems. The extreme remoteness of the locations is directly linked to the poor quality of Internet connectivity. Gauvin et al. (2015) show that in the Cree Nation of “Eeyou Istchee”, located in the southern portion of northern Québec, only one of their communities can be accessed by a small road and they have to use wired Internet and 3G mobile connections. The Eeyou Istchee’s wired Internet services operate on a fiber optic network (Eeyou Communication Network, 2014). In another case, “Kativik”, the name of the regional government operating in the territory of Nunavik, is located in the northern part of the northern Québec and cannot even be reached by a road in which people can only access the Internet through satellite. Indigenous peoples in remote areas of the United States also face the same

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Internet connectivity quality issues. Some reserves in the US do not even have any Internet access at all (Filippi et al., 2013).

For those indigenous communities that are located in remote and rural areas the very low rate of Internet penetration is explained by the remoteness and the high tariffs for Internet access. Eight papers in the sample identified this issue (Ormond-parker & Sloggett, 2012; McMahon et al., 2014; Harp et al., 2012; Filippi et al., 2013; Kopacz & Lawton 2011; Jones, Jacklin, & O'Connell, 2017; Du & Haines, 2017; Gauthier, 2016). The remoteness, vast geographic distances, and small populations of indigenous peoples systematically increase the cost of telecommunication infrastructures (Jones et al., 2017) because there are no incentives for private companies to invest in building them. Therefore, indigenous peoples do not have good connectivity to the Internet (Ormond-parker & Sloggett, 2012; Du & Haines, 2017; Gauthier, 2016). The high cost of Internet connectivity in rural and remote areas also forces many indigenous peoples to live without the Internet or to use outdated Internet technologies (McMahon et al., 2014). The inaccessibility of the Internet and the high cost of Internet service are also challenging for indigenous peoples in Latin America (Harp et al., 2012) and in the USA (Filippi et al., 2013). Statistics in a study by Kopacz & Lawton (2011) show that only a very small number of indigenous peoples in the USA are YouTube users. The authors believe that this is because indigenous peoples face problems with the Internet access and have low computer skills.

In 2016 the Canadian Radio-Television and Telecommunications Commission (CRTC) concluded a year-long review of 'basic telecom services', including considering whether to include broadband in that definition (CRTC, 2016). The review specifically focused on northern and remote regions where many indigenous communities are located. Two papers in my sample identified this issue

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(McMahon et al., 2014; McMahon 2014). The study by McMahon et al. (2014) raised the point that in Canada, universal access to telephone service in both rural and urban areas is required by law and yet the same rule does not apply to Internet service providers. The authors suggested that the Government of Canada should apply this principle regarding telephone provisioning equally to the Internet since it is the new telephone from a social policy point of view. The other study by McMahon (2014) states that indigenous organizations around the globe including in the United States, Canada, and Australia, have attempted to solve digital divide challenges in remote and rural communities by building and managing their own network and Internet infrastructure. Some projects also received government's supplementary funding. This effort to bridge digital divides is viewed among indigenous peoples as a pathway to digital self-determination and self-governance (McMahon, 2014). According to these studies the remote and rural location of indigenous communities is a major factor affecting the digital divide among indigenous peoples. These studies also emphasize that addressing this issue requires strong financial support from federal and provincial governments to invest in the telecommunication infrastructures, which are the backbone of access to social media.

My review of studies also found that remote and rural conditions are closely linked to the following subtopics of the digital divide: poor telecommunication infrastructures, harsh environmental conditions, and lack of local IT professionals. Seven papers in my sample identified these issues (Singleton, et al., 2009; Watson, 2015; Harrison, 2014; Evers, Albury, Byron, & Crawford 2013; Middleton & Crow, 2008; McMahon et al., 2014; Ormond-parker & Sloggett, 2012).

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1.1 Poor telecommunication infrastructures

According to Singleton, et al. (2009), many remote and rural indigenous peoples' communities have telecommunication infrastructures that are in poor condition. This presents challenges that especially affect these communities' access to broadband Internet. From the outset, they have had Internet infrastructure and mobile phone networks that are poorly developed or non-existent in remote areas (Singleton, et al., 2009), (Watson, 2015). This poor telecommunication infrastructure creates more barriers for indigenous peoples to access Internet and social media (Harrison, 2014). A study by Evers et al. (2013) indicates that young indigenous peoples in remote communities in Australia need good quality Internet and satellite connectivity in order to use social media effectively.

1.2 Harsh environmental conditions

Severe weather is very a common occurrence in northern regions of Canada where many groups of indigenous peoples live. Often, the harsh environmental conditions, particularly thunderstorms, damage wireless towers and receiving dishes (Middleton & Crow, 2008). Thus, the harsh environments require a lot of maintenance and repair to the telecommunication infrastructure.

1.3 Lack of local IT professionals

Normally, indigenous communities have to bring in trained telecommunication technicians from distant big cities to maintain their Internet infrastructures. In situations where severe weather conditions have caused disruptions in service, remote communities often have to wait several weeks to reconnect to the internet, in contrast with similar situations in urban settings where IT professionals are in ample supply and are well equipped. Furthermore, trained technicians usually

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do not prefer to work in indigenous communities in remote and rural areas because their wages are higher in cities. Thus, indigenous communities end up with limited technical support (Middleton & Crow, 2008) and suffer from a shortage of well-trained Internet technicians in many remote indigenous communities (McMahon et al., 2014). When some IT projects were introduced to indigenous communities in Australia, there were some serious issues with how to keep the systems up-to-date with changes in technology. There is also a serious shortage of IT experts in indigenous communities in Australia to undertake the maintenance technical work that would prevent IT projects from being discontinued and limit internet access to indigenous communities (Ormond-parker & Sloggett, 2012).

2. Low socio-economic status

Another factor in the digital divide is the generally low socio-economic status of indigenous peoples. As a whole, they are marginalized, live in poverty and experience barriers in terms of accessing quality computer equipment and reliable Internet connectivity and have low levels of computer skills and basic literacy. All of these factors affect their ability to use the Internet and social media (Moisey, 2008). The studies in this review show that there are two specific enabling factors associated with the socio-economic status of indigenous peoples: low literacy and the affordability of technologies.

2.1 Low literacy

Eight papers in my sample identified this issue (Stephens-Reicher, Metcalf, Blanchard, Mangan, & Burns, 2011; Harrison, 2014; Middleton & Crow, 2008; Ormond-parker & Sloggett, 2012; Ornelas, 2014; Filippi et al., 2013; Dodson, Sterling, & Bennett, 2013; Du & Haines, 2017).

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Stephens-Reicher et al. (2011) identify low literacy and the absence of formal education to be a factor in the digital divide among some groups of indigenous peoples in Australia and Harrison (2014) reports the same correlation among peoples of the Caribbean. Consequently, low literacy influences indigenous peoples' rate of adoption of social media and the Internet as well as their ability to use technology. These conditions can generally be found among indigenous peoples (Middleton & Crow, 2008; Du & Haines, 2017), who require computer skills training (Ormond-parker & Sloggett, 2012). Yet, as we note below, these conditions often impact their motivation to become computer-literate (Ornelas, 2014).

The low level of literacy is also tied to a low motivation to use social media. It discourages indigenous peoples' willingness to use new technologies. The absence of motivation then becomes another factor in the digital divide that not easy to solve (Filippi et al., 2013). In a study on the barriers to mobile technology access among Berber-Muslim women in rural southwest Morocco, Dodson et al. (2013) also found a relationship between basic literacy skills and social media usage. The Berber are one of the indigenous groups in North Africa whose dominant mode of interaction is oral. Most of these women in rural Morocco do not have a formal education and are illiterate, which is directly related to the problems they experience with the use of mobile phones and social media. This study showed that eighty-five percent of Berber women participants do not use texting or SMS functionalities on their mobile phones and social media because they cannot write or text. They only can use the voice-capabilities of mobile phones and use them exclusively for telephone conversations.

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2.2 Affordability of technologies

Twelve papers in my sample identified the issue of affordability (Filippi, et al., 2013; Ormond-parker & Sloggett, 2012; Stephens-Reicher et al., 2011; Evers et al., 2013; Dalseg & Abele, 2015; Kral, 2014; Singleton, et al., 2009; Moisey, 2008; Kral, 2014; Watson, 2015; Du & Haines, 2017; Foong, 2018). Technologies require personal financial investments on the part of end-users as well as infrastructure investments by governments and the private sector. Indigenous peoples as a whole are poor and do not have the disposable income to afford technologies. Filippi, et al., (2013); Ormond-parker and Sloggett, (2012); and Stephens-Reicher et al., (2011) identify such financial barriers is another influence in the digital divide among indigenous peoples globally. Indigenous peoples need more affordable mobile phones, laptop computers, tablets, and digital cameras in order to use social media (Evers et al, 2013).

Many remote indigenous households in Canada still face challenges accessing the Internet via broadband, satellite, and Wi-Fi. Dalseg and Abele (2015); Kral (2014); Singleton et al. (2009); Du and Haines (2017) show that in Australia, the limited Internet access available in private residences forces indigenous peoples to seek out Internet access at public institutions like schools, community centres, public libraries, and youth centres where they can connect to the Internet and use social media for free. The same is true in Canada, which, in part, motivated the launch of “the Inclusive Libraries Initiative” by the public and school libraries in Northeast Alberta to turn their local libraries into spaces for indigenous peoples to learn to use the Internet and social media (Moisey, 2008). Since the participating libraries have computers, free Internet and staff to offer computer training (Moisey, 2008), the availability of technical help at those public institutions is important because of the low literacy rate among indigenous peoples. They need the trained staff at the public

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institutions to guide them in the use of computers (Kral, 2014). In Australia, the use of social media in remote indigenous Torres Strait Islander communities has been increasing dramatically because of Internet access from mobile devices, specifically among youth. However, they too face issues with the affordability of high cost Internet and phone services (Watson, 2015). In Malaysia, YouTube has rapidly expanded but it does not apply to the indigenous population living in Sarawak State. They have households with lower access to computers, Internet, compared with the national average (Foong, 2018).

3. Hardware and software

3.1 Cost of mobile phones

Six papers in the sample (Gauvin et al., 2015; Kral, 2014; Ormond-Parker & Sloggett, 2012; Dodson et al., 2013; Jones et al., 2017; Ma, Du, Cen, & Wu, 2016) note that not many indigenous peoples actually own personal computers due to their high cost. Instead, they prefer to own mobile phones. The study by Gauvin et al. (2015) points out that indigenous peoples in Canada are considered to have a predominantly outdoors lifestyle. They travel to various communities and like to interact with people or perform activities in outdoor spaces, so mobile phones are more suitable to their way of life. The cost of mobile phones is much lower now than when cellular internet was first introduced which has helped increase the popularity of social media among indigenous peoples, especially the younger generation (Kral, 2014). Ormond-Parker & Sloggett (2012); Jones et al. (2017); Ma et al. (2016) demonstrate that mobile phones have become an important communication tool in remote indigenous communities. However, mobile phones are still out-of-reach for some groups of indigenous peoples. For instance, the Berber-Muslim study mentioned above (Dodson et al., 2013) indicates that some indigenous women in Morocco do not

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have mobile phones due to their cost. The ones who do own mobile phones use them to make private sales for their Argan oil products. This employment helps Berber-Muslim women have a dependable income.

3.2 Supported languages on mobile phones

One paper in my sample – the Moroccan Berber study (Dodson et al., 2013) – found that the Berber indigenous women bought mobile phones that were pre-owned and originally designed for European users. These phones support the Latin alphabet but not Arabic scripts, which matters even if they are illiterate and cannot text. If they had support for Arabic scripts on their phones, they would be able to use a screen reader application and speech recognition commands to help them better interact with their mobile phones and overcome the literacy barrier.

4. Digital content

4.1 Limit content in indigenous languages

Six papers in my sample identified this issue specifically (Burri, 2010; Bosch, 2010; Pasch, 2010; Crystal, 2012; Young, 2017; Mackey, 2016). They indicate that indigenous peoples think that there is very limited digital content available in indigenous languages on the Internet and social media. Online content is mostly written and spoken in English and it is rare to find indigenous languages used on the Internet and social media. This language bias limits many indigenous peoples engagement with these electronic tools (Burri, 2010). Young (2017) criticizes the fact that digital content on social media that Canadian Inuit interactions with one another are primarily in English. This erodes the prevalence of Inuktitut among the Inuit and hence also has a deleterious effect on

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Inuit culture. Similarly, Mackey (2016) notes that the lack of culturally relevant content on social media makes it difficult to preserve and promote indigenous culture.

Research by Bosch, (2010) reports that many English newspapers in South Africa have already transitioned to digital platforms. However, it is rare to see online newspapers or blogs written in indigenous African languages. Since the majority of indigenous African-language speakers do not have access to the Internet, non-indigenous peoples believe that the demand for digital news in indigenous African-languages is low. Globalization and colonization have resulted in English being the dominant language both online and offline (Crystal, 2012) which has lead to the disappearance of many minority indigenous languages both on the Internet and in social media. Furthermore, most computer programs and online content platforms are not designed or produced specifically for indigenous users because these populations make up such a small proportion of the population. Indigenous peoples feel that they often have to use English to perform tasks on computers because equivalent tools don't exist in their own languages (Pasch, 2010).

4.2 Online censorship

Two papers in the sample identified the issue of censorship (Hansen, 2012; Matamoros-Fernandez, 2017). A study by Hansen (2012) describes the Circassians (Adyghe) diaspora, a Sunni-Muslim Caucasian ethnic group exiled from Russia in the 19th century. This group uses social media to coordinate its political activities and to demonstrate against Russian federal authorities. They are cautious and fearful of online censorship and crackdowns on their social media and Internet activities because they rely on this medium to demand equality, justice, and self-governance.

Research conducted by Matamoros-Fernandez (2017) reports that videos and pictures of indigenous women in Australia with bare chests in traditional ceremonies were banned from

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Facebook. Indigenous activists disagree with this Facebook policy. Matamoros-Fernandez (2017) criticizes the use culture and technologies of social media as vehicles for the dissemination and reproduction of racism and social inequality. At the same time, they also acknowledge that social media platforms also offer ways to address these problems.

5. Age and culture

Eight papers in my sample identified age and culture as factors that are relevant to the use of social media (Hansen, 2012; Singleton, et al., 2009; Gauvin et al., 2015; Gauvin & Lorthiois, 2014; Filippi et al., 2013; Kral, 2014; Lam, Warriner, Poveda, & Gonzalez 2012; Petray, 2011). Three of these studies note that young indigenous peoples are early adopters and frequent users of social media and the Internet (Hansen, 2012); (Singleton, et al., 2009); (Gauvin et al., 2015). Facebook has a high adoption rate and is used with high frequency among indigenous youth and young adults in Canada even in remote communities (Gauvin & Lorthiois, 2014). However, in general, indigenous elders do not like to use new technologies, including social media (Filippi et al., 2013). For instance, a study by (Kral, 2014) shows that some young indigenous peoples use Facebook when looking for a date and post photos or selfies on Facebook to find potential romantic partners but this practice encounter resistance from elders who believe that romantic relationships should develop from face-to-face interactions rather than be mediated by social media.

In some cases, indigenous elders ask children to teach them how to use the Internet and social media because young indigenous peoples learn about computers and social media in their schools. The study by Lam et al. (2012) found that among Mexican indigenous migrants' communities in the US, elders want to learn how to use social media because they want to maintain ties with their indigenous cultures while living abroad. They want to stay in touch with their places of origin in

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Mexico and continue to participate in social and cultural activities and hear about news by using social media and the Internet. In these indigenous diasporas there is a great need for social media.

The greater affordability of Internet technologies and infrastructures for indigenous peoples in remote geographies creates opportunities for elders to share their social and political voices. Indigenous activists, who usually are the core leaders in protest movements, can now use blogs and Twitter to post their opinions even though social media still can be a barrier for some indigenous elders, although they need help from the younger generation to help with the dissemination of their cyber-activism campaigns on social media and the Internet (Petray, 2011).

Principle findings: Objectives

In the studies, I identified four primary objectives for which indigenous peoples use social media.

1. Cyber-activism

Twenty-two papers in my sample identified this topic (Singleton, et al., 2009; Warf, 2009; Harrison, 2014; Elwood & Leszczynski, 2013; Harp, Bachmann, & Guo, 2012; Petray, 2011; Chilwa, 2012; Ornelas, 2014; Bradley, 2013; Wotherspoon & Hansen, 2013; Aikau, Arvin, Goeman, & Morgensen, 2015; Morris, 2014; Beaton & Campbell, 2013; Dalseg & Abele, 2015; Hansen, 2012; Christmas, 2012; Rajão & Marcolino, 2016; Young, 2017; Antoine, 2017; Sobré-Denton, 2016; Brugnach, Craps, & Dewulf, 2017; Hodgkins & Weber, 2016). Social media gives a voice to the voiceless. For indigenous peoples, social media empowers their communities (Singleton, et al., 2009). Since they are socially and economically disadvantaged, their voices are not often heard in the mainstream media and the Internet and social media provide them with an opportunity to send their messages out to the world directly (Warf, 2009; Sobré-Denton, 2016;

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Brugnach et al., 2017). For example, the Caribbean Organization of Indigenous People (COIP) uses their blog as their official website. The content is updated regularly and provides information to raise public awareness about the issues affecting indigenous peoples (Harrison, 2014).

Moreover, social media can be used by indigenous peoples to encourage people to protest against inequality, and injustice and demonstrate in support of civil rights (Elwood & Leszczynski, 2013). In Latin American countries, activists use social media to gather, recruit, and mobilize indigenous peoples to demand their social and political rights (Harp et al., 2012). The Acapu, an indigenous group from the Amazon rainforest in Brazil, use YouTube, Facebook, and other social media tools to save the forest by fighting against global warming (Rajão & Marcolino, 2016).

Similarly, indigenous activists in Townsville in Queensland have used social media to encourage people to sign electronic petitions before submitting them to the government to effect a change in government policy or stop a project. Often, their e-petitions are signed by people from around the world (Petray, 2011). They also used Facebook to create a fan page to publicly display the number of people who support their demands for justice (Petray, 2011). Another case study from Africa about the Igbo indigenous peoples, an ethnic minority in the South Eastern region of Nigeria, illustrates the role of social activism in social media. Historically, the Igbo people briefly separated from Nigeria and were able to establish their own sovereignty as “the Republic of Biafra” from 1967 to 1970. Some peaceful Igbo activist groups such as the Movement for the Sovereign State of Biafra (MASSOB) and the Biafra Online Campaign Groups (BOCG) use social media like blogs and online discussion forums to promote their objective of establishing an Igbo nation. Social media helped the voice of MASSOB and BOCG to be widely heard and also serves as platform for a virtual community of their political supporters (Chiluwa, 2012).

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In Canada, the Idle No More movement started in the fall of 2012 and was organized by local indigenous peoples (Ornelas, 2014; Antoine, 2017). They reached out to the public and demanded changes to the policies of Government of Canada in relation to their sovereignty rights, improvements to their health care, respect for their cultures, raised environmental issues, demanded more government funding, and so on. The Idle No More movement used social media to coordinate, mobilize, and unite indigenous peoples from various communities across Canada to demonstrate their sentiment of injustice to the Government of Canada and to raise public awareness about the issues with which indigenous peoples are dealing (Bradley, 2013; Wotherspoon & Hansen, 2013; Aikau et al., 2015). As a result, they were able to inform the public and recruit large numbers of participants for civil demonstrations and rallies on short notice, including many who were non-indigenous (Morris, 2014). Furthermore, an investigation by Beaton & Campbell (2013) showed that indigenous peoples in Keewatinook Okimakanak, a remote and rural community in northwestern Ontario, used social media to build a virtual community specifically for the purpose of activism. They generated and shared information on social media about their decolonization movements, efforts at building community resilience, and struggle stories and experiences particularly related to their land rights issues. Inuit individuals and organizations in the Canadian Arctic also use social media to transmit their voice to international audiences for political purposes in order to resist the ongoing effects of colonialism (Young, 2017). In addition, there is a Facebook group of indigenous peoples in Nunavut called, “Feeding My Family” whose purpose is to raise awareness about food insecurity in the Canadian Arctic and Subarctic regions (Hodgkins & Weber, 2016)

All the examples above are instances of cyber-activism enhancing an existing offline social movement. Social media cannot be the only tactic for indigenous activists to achieve their

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objectives: they still need to demonstrate on the streets and in person to make sure that their voices are heard by government, businesses, and people who are in positions of power. Social media can be seen as just a tool to bring together and coordinate the actions of people who share the same agenda before the real demonstration finally occurs (Petray, 2011; Dalseg & Abele, 2015). A study by (Hansen, 2012) states that social media can increase physical involvement and mobilization from an online action that leads to an off-line action. Importantly, social media is a low budget method for indigenous activists to organize public demonstrations (Hansen, 2012; Christmas, 2012).

2. Digital archives to preserve and promote their culture

Fourteen papers in my sample identified the issue of archives and culture (Huang, Chen, & Mo, 2015; Dalseg & Abele, 2015; Lam, Warriner, Poveda, & Gonzalez, 2012; Pasch, 2010; Petray, 2011; Kopacz & Lawton, 2011; Molyneaux et al., 2014; Woloshyn, 2015; Lumby, 2010; Carlson, 2013; Corbett, Singleton, & Muir, 2009; Rowsell, Morrell, & Alvermann, 2017; Du & Haines, 2017; Young 2016). Huang et al. (2015) found that social media can be used as a tool to preserve and promote indigenous culture for educational purposes and Dalseg and Abele (2015), Lam, Warriner, Poveda, and Gonzalez, (2012) note that this is especially true for indigenous languages and music. Research by Pasch (2010) provides a good example of indigenous cultural preservation and dissemination using YouTube on which indigenous peoples can showcase their old cultural videos, which, before the advent of the Internet, they had produced for TV and shown only on local community television channels. This is important because there is more indigenous content produced in film and music formats than in the form of books because indigenous languages are mostly spoken rather than written and there is a tradition in indigenous communities of preserving

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their culture with oral history from one generation to the next. Indigenous films and music can be produced and shared via social media very easily (Pasch, 2010) and social media can help to preserve their culture both for the sake of current and future generations but also for the sake of sharing their cultural knowledge and traditions with the rest of the world (Petray, 2011; Du & Haines, 2017). Indigenous youth especially are engaging on social media and are active online content producers. These youth use social media to record and transmit their cultural memories, revealing pride in their indigenous cultural heritage (Rowse et al., 2017).

Furthermore, research by (Kopacz & Lawton, 2011) suggests that indigenous peoples can also use YouTube to produce videos to show positive images of indigenous populations as a way to resist and redefine the negative racial stereotypes that have been perpetuated by the mainstream media, which frequently presents negative racial stereotypes of indigenous peoples as uneducated, alcoholic, and unemployed. In addition, the mainstream media continues to exclude indigenous peoples: they are not often represented in movies, television, news, and newspapers (Kopacz & Lawton, 2011). Molyneux et al. (2014) show that indigenous peoples in Canada can use social media as a way to preserve their indigenous cultures: help keep their languages alive, share photos, tell stories via videos, listen to indigenous music, and enjoy their unique artwork in digital formats. A study by Woloshyn (2015) describes the Twitter-endorsement by indigenous fans of an Ottawa-based vibrant electronic Pow Wow music band called “A Tribe Called Red”. Their tweets show that the group’s music inspires them to have a stronger sense of ownership, pride, self-recognition, and cultural self-determination. In these kinds of situations, social media can strengthen the cultural continuity of an indigenous community and increase its resilience against negative stereotypes. However, some types of social media usage aimed at preserving and promoting indigenous culture have received controversial criticism from non-indigenous social media users.

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Research by Young (2016) reports that images posted on Twitter by Inuit to share their celebration of the traditional bear hunt were not well received from colonial-settler Canadians.

A study by Lumby (2010) indicates that when indigenous peoples use Facebook, they bring their indigenous identities into the virtual space. Indigenous identities on Facebook can be seen as a way to preserve their cultures. Facebook helps indigenous peoples to establish a strong sense of belonging based on the self-represented information about their languages, cultural activities, and rituals which they share with one another. Research by Carlson (2013) demonstrates that indigenous peoples in Australia also use Facebook to communicate with other individuals who share the same indigenous identities. Facebook is the preferred virtual space in which to represent indigenous identities online. A related study by Corbett et al. (2009) shows that the Walkatjurra Cultural Centre, an indigenous organization in remote Western Australia, promotes indigenous culture and raises public awareness of their community issues through social media, particularly blogs with RSS feeds and Facebook. Within the community, the Centre turns social media into a broadcasting channel for community news and initiatives.

3. Connecting and maintaining relationships with other peoples

Twenty papers in my sample identified this topic (Dalseg & Abele, 2015; Watson, 2015; Singleton, et al., 2009; McMahon et al., 2014; Middleton & Crow, 2008; Molyneaux et al., 2014; Walmark, Gibson, Kakekaspan, O'Donnell, & Beaton, 2012; Beaton & Carpenter, 2014; Kral, 2014; Carlson, 2013; Peters, Winschiers-Theophilus & Mennecke, 2015; Hansen, 2012; Pasch, 2010; Lam, Warriner, Poveda, & Gonzalez, 2012; Zúñiga et al., 2014; Webster, 2012; Young, 2017; Du & Haines, 2017; Johnson, 2016; Bidwell, Winschiers-Theophilus, Kapuire, & Rehm, 2011). Social media are used as tools to connect and maintain relationships with other people within and between

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local indigenous communities (Dalseg & Abele, 2015; Watson, 2015; Young, 2017; Du & Haines, 2017; Johnson, 2016; Bidwell et al., 2011). They are used to create community awareness and to inform the community about information and events (Singleton, et al., 2009), (McMahon et al., 2014). Facebook is one social media tool that is extremely well designed for this kind of social communication. Webster (2012) shows that, the Navajo people are no different from most community groups in the way that they express and exchange opinions on Facebook about their local government.

In Canada, a study by Middleton & Crow (2008) notes that the indigenous peoples of the Lac Seul Band Council in Ontario use Facebook more than their local community websites to keep up-to-date with community news. Another similar study by Molyneaux et al. (2014) examines the use of social media in the remote indigenous communities in the Sioux Lookout region of northwestern Ontario where many indigenous communities spread out over a large geographical area. They use social media to maintain relationships and share and exchange information with other people within and between communities. A similar research conducted by Walmark et al. (2012) shows that indigenous peoples living in remote communities in the far north of Ontario use social media, especially Facebook and MyKnet.org (a blogging platform), to communicate with others who are either living within, nearby, or far away from their far north location. Eighty-six percent of the research participants in this study reported using social media daily or weekly (Walmark et al. 2012). The same study found that Northern indigenous women use social media more frequently compared to their male counterparts. In addition, an investigative study by Beaton & Carpenter (2014) reports that indigenous peoples in remote areas in Canada use social media in daily life for educational purposes and to share information with others within and between remote, rural, and urban communities.

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Other research by Kral (2014) conducted in eastern Western Australia in the Western Desert region, discovered that indigenous peoples use Facebook to inform others about traditional ceremonies such as the funeral ceremony. People will travel from distant locations to attend a funeral and Facebook can be used a tool to inform other people about the news of someone's passing and help bring friends and relatives together for the funeral. Then, they will post collections of photographs on Facebook about the funeral event and commemorate the deceased's life, enabling others to post their heartfelt messages and condolences. In addition, Facebook helps indigenous peoples in Australia to find and reconnect with long-lost family members. Many siblings and relatives have discovered each other's existence via Facebook. This has a significant impact on the establishment of kinship in indigenous communities. In the past, given the policies of colonialism, almost every indigenous family in Australia as well as other colonized countries were torn apart. Now, with the help of Facebook, indigenous families are able to reconnect (Carlson, 2013).

Peters et al. (2015) undertook a case study on Facebook practices in Namibia, a country with diverse ethnic groups and languages but which has English as its official language, which shows that Facebook allows Namibians to share their own ethnic cultural practices, important events, and ceremonies with friends from other ethnic groups. Social media is one way for Namibians to learn about the cultural differences that exist within their country yet Namibians post on Facebook in English because they want people in other ethnic groups to be able to understand and engage with their posts rather use their own native language or dialect.

Social media can also bridge and connect members of the same indigenous group who live in different countries (Hansen, 2012). A same indigenous language may be used in more than one

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country and social media can be used to reach a larger audience. For example, Inuktitut is a language spoken among Inuit peoples across the Arctic in Canada, Alaska (USA), Greenland (Denmark), and Siberia and those countries already have a long tradition of consuming and exchanging information via radio. Now, with the addition of social media such as web forums, and wikis, Inuit peoples are connecting with each other internationally (Pasch, 2010). A similar situation occurs with the Circassians who communicate internationally via social media not only in Circassian but also in Russian, Turkish, English, and other European languages depending on where they live (Hansen, 2012).

International migration is now a common phenomenon among some groups of indigenous peoples and social media enables the creation of virtual communities for those indigenous migrants who share the same cultural roots and who live in different countries (Lam et al., 2012). Zúñiga et al. (2014) studied the Tunkaseño indigenous communities whose members are originally from the Yucatan state of Mexico and now live in Southern California as documented and undocumented migrants. They generally speak both Mayan and Spanish and frequently use Facebook to maintain interpersonal relationships and participate in community events that are occurring in their new place of residence. Another similar study by Lam et al. (2012) found that the undocumented and documented indigenous migrants from South American countries living in the southern USA, many of whom have a Maya heritage, use social media to maintain relationships with families and friends at home. Social media enables those indigenous migrants to expand their social ties and relationships across borders and helps them maintain their own culture and pride. This study also explores some of the digital divide issues discussed earlier concerning the computer skills of elder indigenous migrants: they too often need help from their children to teach them to use social media (Lam et al., 2012).

4. Health education and virtual health support groups

Eight papers in my sample identified this topic (Stephens-Reicher et al., 2011; Carlson, 2013; Bosch, 2010; Laakso, Armstrong, & Usher, 2012; Carlson, Farrelly, Frazer, & Borthwick, 2015; Mathieson, Leafman, & Horton, 2017; Jones, Jacklin, & O'Connell, 2017; Finn, Herne, & Castille, 2017). Social media cannot only assist health care providers to connect with indigenous peoples in hard to reach locations (Stephens-Reicher et al., 2011; Carlson, 2013) it can also be an online source of health information and education for indigenous peoples (Bosch, 2010). Health care providers use social media for telemedicine in order to improve access to health care services and health education among indigenous patients living in remote areas around the globe (Mathieson et al., 2017; Jones et al., 2017). In the United States, healthcare providers use YouTube videos, produced in local indigenous languages, to disseminate information to indigenous communities about respiratory diseases especially those that result if they do not use woodstove filters (Finn et al., 2017).

Laakso et al. (2012) found that many indigenous women in remote and isolated locations use social media to find health information and form virtual health support groups for other indigenous and non-indigenous women who are coping with illnesses. Social media can also help with mental health healing. Health care workers in Australia use social media to reach out to young indigenous peoples who are coping with mental health illnesses. In Australia, many young indigenous peoples live in isolated areas and suffer from the stigma of mental health illness, which deters them from seeking help or openly talking to others about their mental health issues. Social media has thus been helping health service teams to promote mental health programmes and services that they offer indigenous youth. Social media also helps indigenous youth to overcome these stigmas since

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they can ask for help on social media without disclosing their identity publicly. Ironically, one of the main criticisms of social media is that they are typically poor at protecting privacy. In Laakso et al. (2012) study, social media was shown to enable some level of anonymity since the communication occurs only between the individual and the mental health care providers who are considered outsiders to the indigenous communities. Their privacy is protected, to some degree, by not allowing peoples in their own indigenous communities to know about their mental illness. This capability of social media encourages people to seek help.

Research by Carlson et al. (2015) shows that several indigenous communities in Australia are facing high suicide rates. In some cases, people even post their suicidal intentions on their Facebook walls. The authors suggest that Facebook can be a tool for implementing suicide prevention strategies. For example, indigenous peoples at risk of suicide can receive uplifting advice from their friends and family to help prevent their attempts at suicide and reduce suicidal ideation. In addition, Facebook makes possible opportunities for immediate lifesaving interventions led by professionally trained officers or counsellors after the individuals at risk have been identified. In this kind of situation Facebook is considered as a pathway for a modern technology based mental health intervention. It does not rely on face-to-face help occurring first, which might arrive too late to save lives.

Discussion

Cyber-activism is the function of social media in indigenous communities that receives the most research attention, more than other topics such as the digital archives to preserve and promote their culture, connecting and maintaining relationships with other peoples, and health education and virtual health support groups. Cyber-activism is studied in the context of many indigenous communities around the world, especially in Canada, Australia, New Zealand, and the USA. These are all countries that have a past and present practice of settler colonialism. While this focus on the study of cyber-activism is understandable in the context of the history of colonial oppression, disempowerment and inequality of treatment that continue to this day. Indigenous peoples now using social media do use it as a tool for cyber-activism to demand justice and social change but also use it to preserve their linguistic and cultural identity and their individual wellbeing. The digital archives to preserve and promote indigenous culture actually involve their tribal traditions that influence the uses of social media and they have to be culturally appropriate as I learned from findings in this review.

The papers included in this review indicate that there are relatively few scholarly publications discussing the digital divide among indigenous peoples' communities worldwide. One study (Coleman, 2010) affirms the reality that the relationship between indigenous communities and the digital divide has not been studied much in the academic literature and mainstream media. In the first part of this review I also saw that the included empirical studies on the digital divide were conducted with remote and rural indigenous communities, mainly in Australia and Canada. But I found no study that researches the digital divide of indigenous peoples in urban settings. Yet, a number of indigenous Americans and Canadians have moved out from their reserves into cities looking for better employment, better access to health care, and better educational opportunities

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for their children. The digital divide challenges faced by many indigenous peoples in urban areas could be different compared to the ones they face in the remote areas. In part, this is because the cities do not have the same problems with the basic telecommunication infrastructure.

Conclusion

The findings from this review suggest that there is a need for more empirical research on the digital divide experienced by indigenous peoples who live in urban areas. The studies included in this systematic literature review show that while there are no fundamental differences between the objectives of social media usage of indigenous peoples and those of the dominant population, there are nevertheless some key attributes of social media usage among Indigenous populations that deserve more study. While the topic of cyber-activism among indigenous peoples has already received considerable attention, it should continue to be researched, given that demonstrations by indigenous peoples continue to take place worldwide. This is an important social phenomenon. In USA and Canada, there are still several ongoing civil rights movements by indigenous peoples and it is very important to understand these situations as they unfold.

Mostly, the research gap in the literature in USA and Canada needs to go beyond cyber-activism. This review demonstrates that indigenous peoples use social media for a variety of purposes other than cyber-activism. Recently, there have been a lot of discussions about suicide and the mental health crisis among indigenous youth in USA and Canada and I urgently need more research on how indigenous youth express themselves on social media when they feel or are at risk. I also need to understand how social media can best be used to help indigenous youth who have to deal with suicidal ideation and mental health challenges. Moreover, this review demonstrates that indigenous youth are heavily engaged with social media. Yet most of the studies on social media use by

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indigenous in USA and Canada only investigate its use in rural and remote communities. I really need more social media research with urban indigenous youth. There has been a dramatic increase of rural to urban migration among indigenous populations worldwide and USA and Canada are no exception.

Acknowledgements

The author would like to thank Mr. Danny Volland, Innu indigenous scholar and candidate in Licentiate in Law (LLL) at the University of Ottawa and Professor Daniel Paré of the Department of Communication at the University of Ottawa, for reviewing the manuscript and encouragement regarding the current study. I would also like to thank anonymous reviewers of a previous draft for their suggestions and comments.

Chapter 4: ARTICLE 2

Connecting with youth at risk: Indigenous organizations use of Facebook

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This article is in press at the Journal of Community Informatics.

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Abstract

Background: Urban centers pose significant risks for indigenous youth. There is no academic literature documenting the voices of the indigenous organizations in urban areas and how they use Facebook to connect with youth at risk.

Objective: Explore how and why indigenous organizations use Facebook to engage with urban indigenous youth at risk.

Hypothesis: Indigenous organizations can reduce risk among urban indigenous youth by engaging and disseminating information on Facebook.

Method: A qualitative study in which we conducted four interviews with two communication managers and two youth program managers of three indigenous organizations with offices in Ottawa. The data generated from the interviews were coded based on factors identified through thematic analysis.

Findings: Facebook is used to engage with urban indigenous youth at risk only among indigenous organizations that provide social programs and outreach. Our data also show that the organizations interviewed are aware that urban indigenous youth in Ottawa are using Facebook to combat their loneliness by contacting their families and friends who reside in rural and remote communities. Organizations are also aware of the risks that indigenous youth experience every day in cities and look to Facebook feeds to help mitigate these risks.

Interpretation: When indigenous organizations in Ottawa create Facebook campaigns for local indigenous youth they address the broad diversity of indigenous cultures, languages and dialects by creating Facebook posts with few words and focus more on images and videos.

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Conclusion: Indigenous organizations use Facebook for two main reasons. The first reason is to promote the work of these organizations to the public and for them, in turn to listen to the public's opinions about news related to indigenous peoples' wellbeing. Secondly, Facebook is also used to engage urban indigenous youth at risk with indigenous organizations that provide social programs and outreach. Indigenous organizations use Facebook because many urban indigenous youth in Ottawa are using Facebook and it is the fastest way to connect with them when they are or feel at risk.

Keywords: Facebook, urban indigenous youth, qualitative research

Introduction

Farzindar and Inkpen (2015) describe social computing as “an area of computer science that is concerned with the intersection of social behaviour and computational systems” (p.109). Similarly, Facebook (2016) defines social computing as “computational techniques and tools to study human social behaviour”. Social computing is thus comprised of two essential elements: social behaviour and the computer systems that enable this behaviour. We believe that social behaviour is closely tied to norms of cultural behaviour in specific populations and in this research, we propose to use social computing perspectives to study how and why indigenous organizations use Facebook to engage and disseminate information with urban indigenous youth at risk in Ontario.

Our assumption is that indigenous organizations can reduce risks among urban indigenous youth in Ontario by engaging and disseminating information on Facebook. Given that urban centers pose significant risks for urban indigenous youth (Miller et al., 2011), it is critically important to develop an understanding of how indigenous organizations use social media like Facebook to disseminate

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information to their targeted populations, particularly urban indigenous youth, who use Facebook and other social media heavily and daily.

One problem is that help for vulnerable indigenous youth frequently arrives too late. It normally takes some time for family, friends, community members, and government agencies to identify indigenous youth in danger. It also usually takes some time for people voluntarily seeking help to inform their family members and friends about their situation. Besides these barriers, some matters are associated with social stigmas especially drug addiction and mental health. The delayed identification of indigenous youth at risk poses great challenges for how to provide assistance and treatment.

We explore how the indigenous organizations use Facebook to engage with urban indigenous youth at risk in Ottawa through conducting in-person interviews with two communication managers and two youth program managers of three indigenous organizations based in Ottawa. The interviews were conducted during the spring and summer of 2017.

Our contribution is an analysis of how indigenous organizations could reduce risk among urban indigenous youth by engaging and disseminating information on Facebook. We have found that many indigenous youth living in Ottawa experienced remote-to-urban forced migration. Many of them came involuntarily to Ottawa in order to receive medical care not available in their remote home communities. Urban indigenous youth in Ottawa are using Facebook to combat their loneliness by contacting their families and friends who reside in rural and remote communities.

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Background

UNESCO (2016) defines youth as the population group ranging from 15 to 35 years of age. Youth, according to that definition, are the most at risk age group in populations across societies and cultures. This stage of life comes with changes in hormones, physical state, mood, and social behaviour while having to find one's identity and become autonomous. Youth in vulnerable and impoverished populations face an even a higher risk since dealing with poverty and vulnerability add to the transitional challenges.

In this research, the term “at risk” means that individuals face a high probability of being exposed to physical and/or psychological harm or danger. For this research, we focus on urban indigenous youth because they face increased risks in terms of health care, education, housing, unemployment, racial and cultural discrimination, substance addiction, murdered and missing indigenous women, sexual abuse and domestic violence, and youth suicide (Boksa, Joobar, & Kirmayer, 2015); (Drache, Fletcher, & Voss, 2016). We chose to further narrow the geographic scope of this study to urban populations in the city of Ottawa, Ontario given that data from Statistics Canada shows that the majority of indigenous peoples in Canada live in the province of Ontario and mostly in urban areas rather than on reserves which are often more rural and remote. Census data collected in 2011 indicates that out of Canada's total indigenous population of 1.4 Million, 21.5 % (301,425) reside in Ontario (Statistics Canada, 2015a). This amounts to 2.4% of the population of Ontario, considerably lower than the national percentage of the indigenous population in Canada at 4.3%, (Statistics Canada, 2015b). The percentage of indigenous peoples with registered indigenous status living off-reserve in Canada stands at 50.7% (Statistics Canada, 2015b). Many of them now live in urban areas of Ontario such as Toronto, Ottawa, Thunder Bay, Sudbury, Hamilton, and Sault Ste. Marie (Ontario Federation of Indigenous Friendship Centres, 2013).

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Ottawa is the capital of Canada and has a population of approximately one million people (City of Ottawa, 2014). It is the seat of Parliament and as the main location of the federal government, it is where important policy decisions are made that have an impact on all indigenous communities across the country. According to the 2011 statistics from the City of Ottawa there are about 18,180 indigenous peoples living in Ottawa (Statistics Canada, 2015c). The number is quickly growing and many of the indigenous peoples in Ottawa are young with 4 in 10 being under the age of 25 (Statistics Canada, 2017). Therefore, Ottawa is a good location for this study since the city attracts indigenous youth from many communities within Ontario and from other provinces as well.

The city of Ottawa has a number of diverse indigenous organizations; no other city in Ontario has the same characteristics. Ottawa's indigenous organizations look after the basic needs and wellbeing of indigenous residents, including their housing, education, health, and culture. These functions are similar to the indigenous organizations in other cities in Ontario but Ottawa is only the city in which many national-level indigenous organizations have chosen to locate their headquarters. At the time of writing this article, there are 15 indigenous organizations located in Ottawa. Of these entities in terms of focus 9 are policy-oriented and 6 are community outreach organizations. Policy-oriented indigenous organizations negotiate and participate in political matters with the Canadian federal government and parliament who are also located in the capital. Community outreach-oriented indigenous organizations focus on providing support to all indigenous people living in Ottawa. The characteristics of indigenous organizations in Ottawa are unique and position this study well to gather both regional and national information about how the indigenous organizations use Facebook to engage with urban indigenous youth at risk.

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In recent years, researchers have looked at social media and Internet usage by indigenous people who live in rural and remote areas around the world, mainly in Australia, Canada, United States, and New Zealand (Gauvin, Granger, & Lorthiois, 2015; Filippi et al., 2013; Ormond-parker & Sloggett, 2012); (McMahon, Gurstein, Beaton, O'Donnell, & Whiteduck, 2014; Kopacz & Lawton, 2011; McMahon, 2014; Singleton, et al., 2009; Watson, 2015). The purpose of social media usage among indigenous peoples include cyber-activism (Warf, 2009; Elwood & Leszczynski, 2013), digital channels to record and promote their culture (Huang, Chen, & Mo, 2015; Dalseg & Abele, 2015), connecting and maintaining relationships with other people (Watson, 2015), and seeking health information and establishing virtual health support groups (Stephens-Reicher et al., 2011; Carlson, 2013; Laakso, Armstrong, & Usher, 2012). There is no academic literature documenting the voices of the indigenous organizations in urban areas, who work diligently to offer services, run outreach programs, and advocate for indigenous rights, and how they use Facebook to connect with youth at risk.

Research methodology

Research design

We interviewed two communication managers and two youth program managers who are responsible for social media campaigns in the three indigenous organizations in Ottawa. Their social media activities are followed by many of the indigenous youth in Ottawa. We conducted four interviews in total. Each interview lasted between 45 and 60 minutes. These interviews aimed to discover their Facebook strategies and practices for engaging with urban indigenous youth at risk.

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Recruitment

We recruited participants by approaching them directly with a formal email that explains the research project. The information sheet, informed consent form, and interview guidelines were also attached. We used email addresses that were found on indigenous organization websites with office addresses in Ottawa. We waited for their email responses in order to schedule the interview and we followed up by telephone.

Data collection

We held our interviews at the participants' offices in a private meeting space. In this research, the interviews were semi-structured and used interview guidelines. This allowed interviewees to freely express their personal opinions and to add their own comments beyond the prepared questions. The interviews conducted with communication managers, whose roles included generating and sharing content on their organization's Facebook page, and youth program managers whose roles are to run cultural and social activities for indigenous youth in Ottawa and act as the first responder in identifying indigenous youth at risk and help them to receive or access necessary assistance. This was followed by inquiries focused on their professional use of Facebook, the types of content they read, generate, and share on Facebook for their organizations, whether their Facebook content targets urban indigenous youth who feel at risk physically and/or psychologically, their observations when an urban indigenous youth is at risk through the language or verbal tone of the content that he or she has generated or shared on Facebook, and the support of indigenous culture toward generating and sharing content on Facebook. There was no financial compensation for their participation.

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Data analysis

Our interviews were audio-recorded and done in-person. The data generated from the interviews were manually transcribed in English and coded based on patterns identified through thematic analysis (Braun, & Clarke, 2006). Based on our research question, how and why indigenous organizations use Facebook to engage with urban indigenous youth at risk, and interview guidelines, we developed predetermined codes and then created additional codes to capture specific emergent themes when we were more familiarized with the data. Our data analysis codes include Facebook usage frequency, account control and access, type and format of information generated and shared on Facebook, motivations, challenges, indigenous attitudes toward Facebook, and their observations on Facebook usage among urban indigenous youth at risk. Then we did the second and third level content analysis to identify relationships between themes. As the number of our interviews was not large, we were able to make comparisons between each interview to find the similarities and differences to further improve our data analysis with special attention to the type of indigenous organizations (1. National; 2. Regional) and their work mandates (1. Advocacy and political issues; 2. Social programs and outreach). We presented our preliminary findings to our interviewees in this research in September 2017, which helped to enhance the quality of our findings (C. Intahchomphoo, personal communication, September 19, 2017).

Ethics

This research received ethics approval from the Health Sciences and Science Research Ethics Board of the University of Ottawa (File# H02-17-01). We asked research participants to give written consent in willingness to participate in the interviews. They were given time to read the consent as much as they needed and prior to the interviews taking place. We also read the consent

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aloud to the participants. In the results section, we omitted all personally identifiable information including participants' names, organizations, addresses, and physical appearances. We used pseudonyms for our participants in this paper. No data from this research was stored online in a cloud-computing environment. Data will not be shared with any third parties. In terms of the assessment of risks, we only publish results where we have explicit permission from the indigenous organizations and the communication managers and youth program managers from which we obtained data.

Results

Indigenous organizations in Ottawa frequently use Facebook and their Facebook accounts are being controlled by communication managers and management level personnel.

"I, the executive director, and one of the managers are pretty much the people who focus on communications through Facebook."- Alinga

All of our four interviewees (whose pseudonyms are: Adoni, Alinga, Alba, and Alkina) said that their indigenous organizations use Facebook on a daily basis. We discovered that many indigenous organizations in Ottawa do not have a high capacity to constantly generate new content for their Facebook accounts due to human resources limitations. As a result, they also read and share other organizations' and individual's posts to display on their organizations' Facebook walls. Generating new content of their own is usually done internally with a small team consisting of members from administrative staff, community outreach staff, and communication managers. Those people have full access to the organizations' Facebook accounts.

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Indigenous organizations in Ottawa use Facebook to share information about the important events and meetings that staff attend, to listen to public opinion about emerging indigenous peoples' issues and concerns, and to promote their outreach campaigns.

"A couple weeks ago, he (organization leader) was in New York at the United Nations. I will post pictures of him there." - Adoni

Two interviewees mentioned that their indigenous organizations use Facebook to share information about the attendance by their directors or staff at prominent social events and work-related meetings taking place in Ottawa or other urban cities and rural areas in Canada, as well as abroad. Furthermore, we learned that sharing information about such events on Facebook is being done at two out of three indigenous organizations we interviewed in Ottawa.

Moreover, from our interviews we discovered that indigenous organizations in Ottawa use Facebook to listen to public opinion about issues and concerns arising in indigenous communities. These are some examples of quotes from our interviewees on this matter:

"I think that we found a lot of strength on Facebook. We were able to connect with other people in term of understanding indigenous issues. I find that there are power in mini voices and sharing information" - Alba

"I use Facebook often to find news stories that people shared from other parts of the country that might be interested ... for example, the missing and murdered indigenous women inquiry"- Adoni

The national inquiry into missing and murdered indigenous women and girls was discussed in two of our four interviews. We were told that information and opinions about the inquiry are also being shared and discussed on the indigenous organizations' Facebook accounts. When the inquiry was

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starting, there were a lot of different opinions about whether they were doing a good job or whether an inquiry should be held at all and a lot of people shared their thoughts on Facebook. Some indigenous organizations in Ottawa would use the peoples' thoughts on Facebook to get a sense where the organizations should stand on this issue.

Facebook is also used to see what other peoples in the indigenous world are doing and what communities' issues and challenges are like in different parts of Canada. Adoni expressed the personal opinion that Facebook is a good tool for indigenous organizations to keep track of other politicians and other indigenous leaders to see what they are doing that could impact the wellbeing of all indigenous peoples in Canada.

In addition, we noticed another aspect of Facebook usage among indigenous organizations in Ottawa especially the ones with a mandate to provide community-based programs and services: they put a very strong emphasis on using Facebook to promote their outreach campaigns. Below are some sample quotes from our interviewees:

"We have an upcoming campaign about childhood sexual abuse. This campaign will disproportionately be on Facebook." - Alinga

"We post information (on Facebook) of our programs and any helpful information about safety or knowledge about abuses." - Alba

"Through Facebook we actually reach [out] to some of the youth that are on [the] street and our outreach people [are able] to access them and find them and get them into shelters." - Alkina

Alinga, Alba, and Alkina advised us that in Ottawa as well with other parts of Canada, there are conversations being held about indigenous youth's mental health, suicide crises, and substance

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abuse. These are also significant social problems among urban indigenous youth in Ottawa. Substance abuse has a strong relationship with mental illness and suicide (Agrawal et al., 2017). Our interviewees commented that there really should be more public discussion and Facebook campaigns on those specific topics. Interestingly, in our interviews we also were briefed that they have to ensure that whatever content they post on Facebook targeting urban indigenous youth must not be too manipulative, controversial, or emotionally taxing. This is particularly the case when the Facebook post targets urban indigenous youth who are at risk. Otherwise, it is possible they might see the organizations' Facebook outreach campaigns and react with psychological or emotional discomfort, which may have social repercussions particularly since urban indigenous youth in Ottawa do not necessarily know where they can get help. Therefore, indigenous organizations in Ottawa are extremely mindful of the sensibilities of urban indigenous youth when creating Facebook outreach campaigns.

Other campaign materials such as posters and press releases that the indigenous organizations have created also go through their Facebook pages. Some of our interviewees indicated that their organizations also use Twitter to disseminate information about their outreach campaigns, but remarked that it is not as popular as Facebook. They found that Twitter is difficult for the indigenous organizations' outreach campaigns in part because of the limited word count of tweets.

They also believe that Facebook functionality is better suited to oral expression, which aligns with the indigenous peoples' rich oral history traditions. Indigenous youth can use Facebook video functionality to verbally express and share their thoughts and feelings disseminated in the form of moving images and sounds to their circles of friends on Facebook. Sharing a video does not require an indigenous youth to input any text. Furthermore, Facebook videos can be produced and

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uploaded very easily on smartphones, which are the devices that most urban indigenous youth in Ottawa are using.

Many urban indigenous youth in Ottawa are unaccompanied and they were forced to migrate to the city. They use Facebook to connect with their families and communities in the rural and remote areas from which they came.

“It is very overloaded in the urban setting, it is very challenging. It does compound with race and class... I think when you are here alone your connectivity is so important and that why they are relying on Facebook to get in touch to their home community.” - Alinga

The data from our interviews helped us to recognize the crucial relationship between remote-to-urban forced migration (Darling, 2017) and urban indigenous youth in Ottawa. Unfortunately, many of them are also living in Ottawa without any family members accompanying them from their home communities. In many cases, they were forced to migrate to Ottawa to receive medical care or better education, which are not available in their more remote communities. So, those indigenous youth often end up living alone for a long period of time in Ottawa, as some medical care can be very lengthy. Because they reside in Ottawa on their own, the connection with their families and communities in rural and remote areas is often done through Facebook on their personal cellphones. For the unaccompanied urban indigenous youth in Ottawa, it is very important to maintain ties with their home communities, so their Facebook connectivity is not only about maintaining social connections but it is also about staying connected to their indigenous cultures. Here we see the use of Facebook by unaccompanied urban indigenous youth is at the intersection of personal relationships and cultural identity. When they use Facebook to connect with remotely

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located family and friends, they are also being updated with a lot of social news what is happening in the community, which nourishes and sustains a very important part of their cultural identity.

One of our interviewees said that urban indigenous youth in Ottawa who wish to return to their rural and remote indigenous communities face many challenges because of the high cost of transportation to their homes. In addition, there is also now a housing crisis in many indigenous reserves in Ontario and other provinces and territories (Anaya, 2015). For urban indigenous youth in Ottawa to return home, they must find a place to live and their families often experience overcrowding with multiple families in one house. In many cases this situation would have worsened since they left their communities.

Therefore, many urban indigenous youth who leave remote communities for southern cities like Ottawa do not have much choice but to continue to stay in the city. They therefore have to live alone for a longer period than they had expected in a place that has a very different culture with different social interactions than their home communities. Unfortunately, these circumstances are contributing factors to the struggles that many urban indigenous youth faces. The circumstances increase risks such as drugs and alcohol, which are readily accessible in urban settings.

Using minimal text and simple language with images and short videos on Facebook posts.

“The number one thing that people (indigenous youth) said is to cut back on the text (on Facebook).” - Alinga

“I was editing some videos ... I just promoted the event on Facebook. The video I did is about 30 seconds.” - Adoni

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Indigenous organizations in Ottawa prefer to use short videos to communicate on their Facebook pages. For them, it is essential to use minimal text with simple language. This is due to the fact that neither English nor French are the first language of many urban indigenous youth living in Ottawa although many do speak English or French as a second language depending on where they were raised. Therefore, indigenous organizations in Ottawa prefer to use audio and visual media to communicate with indigenous youth. We observed that indigenous organizations in Ottawa use symbolic imagery on their Facebook posts such as the ancient traditional indigenous arts and paintings with the cultural representations about the concepts of spirituality, human beings and animals, and the relationship to the nature. Normally, they cut back on text as much as they can and they keep the English or French text to a reading level that is appropriate to their readership. They also ensure that the images they use represent indigenous peoples. In terms of being culturally appropriate, our interviewees indicated that this is very important because otherwise indigenous youth will just scroll right past it on their Facebook's News Feed if they have non-indigenous themed designs.

In our interviews, the research participants discussed at greater length the fact that Facebook posts are fast paced and its News Feed has a rapid turn-over rate. However, they have to ensure whatever they post is eye catching, colorful, and not too wordy, in order to capture indigenous youths' attentions. Adoni added in her opinion, Facebook has contributed to shortening indigenous youths' attention spans. A study on the future of on-line news video by Kalogeropoulos, Cherubini, & Newman (2016) suggests that, to have an impact, even videos on Facebook have to be short and tight.

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Indigenous organizations in Ottawa have different motivations for their Facebook strategies.

“We are trying to figure out how to get into the indigenous peoples’ Facebook algorithm for them to see our posts on their Facebook walls. That is one of our motivations—how to get ourselves out there more.” - Alinga

Some indigenous organizations in Ottawa explained that they want their Facebook posts widely shared to help their organizations to better connect with urban indigenous youth. One way to evaluate social media strategies and to measure the public reach of Facebook posts is to count the number of “shares”. All of our interviewees want to maximize the extent to which their messages reach the public on Facebook. However, the indigenous organizations in Ottawa with a Facebook outreach mandate sometimes find it difficult to get across information about programs and services that they have available to assist indigenous youth.

On the other hand, there are other indigenous organizations in Ottawa who are working on the political side and advocating for indigenous peoples’ rights. Their Facebook motivation is more about how to quickly inform all indigenous peoples about forthcoming laws, amending legislation, the House of Commons and Senate debates, and the Prime Minister messages to the members in the Chamber and the public that will be introduced in the Canadian Parliament, which they believe may have a great negative impact on their people. Their motivation for posting on Facebook is more to address political and legal changes and to raise awareness, which in some cases might lead to public mobilization (Wood, 2015).

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Challenges with Facebook usage by urban indigenous youth in Ottawa include: language barriers, personal interests based on age, content creation during slow periods, and cellphone data plan limits.

“When you are 13 years old, you are usually not thinking of the term ‘mental health’. So, interest is difficult”. - Alinga

“Not all the youth have a data plan on their cellphones ... a lot of them do not own [a] cellphone. It is very important that we actually reach out to somebody.” - Alba

We found the first main challenge of reaching out to urban indigenous youth in Ottawa via Facebook is the language barrier. Across the board, language is the most common challenge for indigenous organizations in Ottawa. Language barriers among urban indigenous youth create a sizeable communication gap. For example, a study by Arnaert & Schaack (2006) in a different context suggests that Inuit patients in the emergency department at hospitals in Montreal should have a direct access to a nurse or interpreter who can speak their language. Overcoming language barriers helped to improve their experiences with medical care. Alinga mentioned in our interview that urban indigenous youth speak a wide variety of languages and dialects. Their understanding of English or French is often very basic, which creates a significant language barrier between them and the indigenous organizations who are trying to reach out.

Personal interests based on age are another challenge. Alinga thinks that youth of all societies usually do not think much about the complex truths of their lives, especially their own mental health. Therefore, it is difficult to engage urban indigenous youth in Ottawa with Facebook posts related to mental health. Another challenge described by Adoni is about creating new content when there are few significant events happening, especially within indigenous organizations that work

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on politics and advocacy at times when there is not much political activity. All the interviewees were not inclined to visit their Facebook pages unattended and they like to update these pages as often as possible. This is another challenge for these organizations: finding new content to post about when there is not necessarily much going on, such as when the Canadian Parliament breaks for summer.

One last challenge shared by Alba was that urban indigenous youth in Ottawa who own a cell phone typically do not have a data plan on their cellphones. Many of them rely on free Wi-Fi offered at public libraries, schools, and indigenous organizations. Interestingly, Alba also told us that a lot of indigenous youth in Ottawa do not own a cellphone. They access to their social media accounts by using public computers or their friends' cellphones. Alba faces this technological barrier in reaching out to this population and this challenge becomes more acute when reaching out to urban indigenous youth who are actually at risk and require emergency services.

Indigenous culture supports generating or sharing content on Facebook.

“It is interesting how indigenous cultures have embraced Facebook. Indigenous peoples still have powwows but you will find information about powwows on Facebook, like the electric powwow from the Tribe Called Red.” - Adoni

“We are able to reach more people through Facebook. We put out our survey and we put out other things how people can access our services.” - Alba

Adoni further explained his quote above by referring to the Idle No More movement that began in 2011, the indigenous rights demonstration that was organized through Facebook. Nowadays, it seems any kind of social event, gathering, or movement of indigenous peoples is certainly driven by social media.

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Our interviewees suggested in several group meetings that the indigenous organizations in Ottawa should consider Facebook as a main source of communication for giving notices and sharing other valuable information. From our interviews, we were told that indigenous youth claim that they check email but in fact they do not like to do so and they are more easily reached on Facebook since they already log-on to Facebook multiple times every day. In conclusion, indigenous communities are supportive of generating or sharing content on Facebook. Facebook is the easiest way for many of the urban indigenous youth to connect with others at home without the restrictions of geography and hence a natural channel for urban indigenous organizations to connect with them.

Indigenous organizations have urged Facebook [the company] to help them detect the presence of urban indigenous youth at risk.

“I can see how certainly it (Facebook) will help someone who is feeling with suicide or depressed to be reminded the good things in life when everything seems bad.” - Adoni

“I think a lot of youth who are having a hard time will end up throwing all that out. They vent. They put it in text and a lot of youth are putting music. They put out videos of different songs that are sad.” – Alkina

All of our interviewees agreed that Facebook is now a big part of their organization’s social media strategy. In term of indigenous youth at risk, our interviewees think Facebook has at least shined a light on many of the issues faced by urban indigenous youth at risk. Adoni gave an example of somebody who was living in a fly-in community in northern Ontario and feeling depressed. Prior to the era of social media, nobody in the world would have known about this person’s state but because people can express their feelings and their thoughts more easily on social media and reach a wide audience, there is a higher likelihood that such people could be found and helped. Our

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interviewees felt strongly that Facebook could help urban indigenous youth at risk especially the ones who are struggling with mental illness and suicidal ideation.

Adoni explained to us why so many of the urban indigenous youth are facing mental illness, as evidenced by the language and verbal tone of the content that he or she has generated or shared on Facebook. One of the main causes, he says, is the intergenerational trauma of the residential schools' policy implemented and enforced by the Canadian Government between 1880 and 1996 (Miller, 2012). Adoni began by referring to the Truth and Reconciliation Commission and commented that it had done a good job of showing how residential schools stole a generation of indigenous peoples. In that one generation, children were sent to schools away from their families and never learned what it was like to have a parent. Therefore, they often did not learn to parent themselves and it is hard to break that chain of dysfunction when they have children of their own. They do not know how to be parents for their children and pass on this inability to their own children thus perpetuating intergenerational trauma (see: Bombay, Matheson, & Anisman (2014) and Elias et al. (2012)).

Whereas another interviewee remarked that Instagram has recently become popular among urban indigenous youth, it would not necessarily be a good enough medium to be able to express or identify their mental health, in part because Instagram has different purposes and modalities of expression. Our interviewees indicated that urban indigenous youth feel more of a community base with Facebook whereas Instagram is more like Twitter, less engaging with a community. Instagram is more about publishing user-generated content mostly pictures and it is less about news (Phua, Jin, & Kim, 2017). They know their people on Facebook and they can configure privacy controls for their groups and communities. It is also a more group platform with more ways to share

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thoughts, opinions, and feelings. So, it was noted the youth feel that they can talk about their mental health issues more freely on Facebook including depression and suicide.

Discussion

Study findings

Our interviews revealed the unexpected fact that many indigenous youths living in Ottawa experienced remote-to-urban forced migration. Many of them came involuntarily to Ottawa in order to receive medical care not available in their remote home communities. Unfortunately, they are not able to return to their reserve communities because of the length of their treatment. Often, this forced migration also made them unaccompanied youth migrants. They had to migrate to Ottawa without being under the care of a parent or legal guardian. This situation is a result of the poor access to health care in rural and remote indigenous communities in Canada and the health care funding inequalities between rural, remote, and urban settings in Canada (Marrone, 2007).

Consequently, urban indigenous youth in Ottawa are forced to live alone for long periods of time without family interactions, which adds to their existing risks such as drug use, dropping out of school, and lack of access to good quality food. We learned from our interviews with indigenous organizations that unaccompanied urban indigenous youth living in Ottawa use Facebook to connect with their families and communities in rural and remote areas. Facebook is a therefore a tool for them to stay connected to their roots while they live in the city. Facebook is being used as a place where urban indigenous youth seek dignity, love, and care from their own people and to stay connected to their culture, things that they cannot find in the city. They can also gain spiritual support when they learn about what their friends, siblings, parents, and other community members

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are doing from Facebook News Feeds. Even simply seeing short texts, images, and videos on Facebook, generated and shared by their circle of Facebook friends can help these youth cope with their experience of loneliness in Ottawa. Our interviewees indicated that encouragement and support are what these young people benefit from the most in their Facebook usage.

When indigenous organizations in Ottawa create Facebook campaigns for local indigenous youth they address the broad diversity of indigenous cultures, languages and dialects by creating Facebook posts with few words and focus more on images and videos. We observed that English is the lingua franca that indigenous peoples use to communicate with other groups of indigenous peoples whose first languages are different from their own. This explains why our interviewees mentioned their use of simple English syntax on their Facebook posts. Also, these organizations' use of images and videos is not straightforward because they have to come up with the materials that are culturally appropriate while avoiding possible misinterpretations caused by cultural differences. For example, when an organization envisages running a campaign about HIV prevention and safe sex practices among indigenous youth, they have to carefully consider how to disseminate the campaign information including images and videos on Facebook in a manner that is culturally appropriate given that sex is still a taboo topic in many indigenous communities (Mill et al., 2008).

We also noticed that there are differences in the ways in which Facebook is used by indigenous organizations in Ottawa, differences that depend on their mandate and their target population. For organizations who are working on outreach programs, Facebook accounts directly target urban indigenous youth in Ottawa and many of those youth are also following the organizations' Facebook posts. These outreach programs can identify the urban indigenous youth at risk of drug

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addition, homelessness, unemployment, HIV, health care access hardship, and dropping out of school and their posts are aimed at this population with these issues. On the other hand, in the case of indigenous organizations whose mandate is advocacy and political issues, their Facebook accounts seldom target urban indigenous youth in Ottawa. They look more broadly at the governing bodies of indigenous peoples across the country in order to work and communicate with the Canadian Federal Government. Their Facebook pages target all indigenous people across the country, NGOs, and government.

Limitations

Our study has some limitations. We restricted our interviews only to communication managers and youth program managers of indigenous organizations with offices in Ottawa, the capital city of Canada. We did not conduct this research in other cities in the province of Ontario, nor did we conduct research in other provinces and territories of Canada where many other indigenous youth also reside. Thus, we do not aim to report findings of all indigenous organizations on the national level.

Conclusion

Indigenous organizations use Facebook for two main reasons. The first reason is to promote the work of these organizations to the public and for them, in turn to listen to the public's opinions about positive and negative news related to indigenous peoples' wellbeing. Secondly, Facebook is also used to engage urban indigenous youth at risk with indigenous organizations that provide social programs and outreach. Indigenous organizations use Facebook because many urban indigenous youth in Ottawa are using Facebook, and it is the fastest way to connect with them when they are or feel at risk. Communicating with urban indigenous youth in Ottawa via Facebook

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is difficult because there are several cultural and language differences among the diverse indigenous peoples in Ottawa. Indigenous organizations have solved this issue by using a minimal amount of simplified English as well as images and videos in their messaging. We learned that urban indigenous youth in Ottawa are using Facebook to stay in contact with their families and friends in remote communities in order to combat their loneliness and other risks that they are experiencing in the city. Moreover, we discovered some unexpected realities about the forced migration and unaccompanied youth migration of indigenous youth in Ottawa.

Acknowledgments

The authors would like to thank the research participants, for sharing their stories and reviewing the manuscript and their encouragement of this research and Mr. Danny Vollant, Innu indigenous scholar and candidate in Licentiate in Law (LLL) at the University of Ottawa, for reviewing the research proposal for the current study. This first author would like to thank scholarships partially used in this study: the 2016 Queen Elizabeth II Graduate Scholarship in Science and Technology. The opinions expressed in this paper are those of the authors and do not represent the views of the organizations and funders with which the authors are affiliated.

Chapter 5: ARTICLE 3

Facebook Usage among Urban Indigenous Youth at Risk

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This article was submitted for publication in the Canadian Journal of Communication.

Abstract

Background: Urban centers pose significant risks for indigenous youth. There is no academic literature documenting the voices of how urban indigenous youth express themselves on Facebook when they are or believe they are at risk either physically or psychologically.

Objective: Explore how urban indigenous youth at risk express themselves on Facebook.

Hypothesis: Urban indigenous youth at risk use the capabilities of Facebook to communicate their at-risk situation in both explicit and implicit ways to their peers.

Method: A qualitative study was conducted in which we organized five focus group discussions with twenty urban indigenous youth aged 14-35 in Ottawa, Canada. The data generated from the discussions was coded based on patterns identified through thematic analysis.

Findings: Many urban indigenous youths generated and shared content on Facebook when they felt at risk either physically or psychologically. The topics ranged from personal emotions to indigenous community issues. Our focus group discussion participants could tell if one of their friends was at risk through the language or verbal tone of the content that he or she would generate or share on Facebook.

Interpretation: Urban indigenous youth at risk generated and shared content on their Facebook as text, photo, and video because they wanted to vent their frustrations. At the same time, they were looking for help from others. Alarmingly, we learned that Facebook was used by some urban indigenous youth at risk as a tool to live stream their suicide attempts and self-harm.

Conclusion: The hypothesis is supported. Most urban indigenous youth in Ottawa expressed themselves on Facebook when they were or felt at risk either physically or psychologically. The

findings could be used to flag users at risk and develop Facebook News Feed algorithms that mitigate the risks of identified users.

Keywords: Facebook, urban indigenous youth at risk

Introduction

Help for vulnerable indigenous youth frequently arrives too late. It normally takes quite some time for family, friends, community members, and government agencies to identify indigenous youth at risk. It also usually takes a certain amount of time for people voluntarily seeking help to inform their family members and friends about their situation. In addition, some matters carry social stigmas, such as especially drug addiction and mental health. The delayed identification of indigenous youth at risk poses great challenges for how to provide them with assistance and treatment.

In this research, we propose to use social computing perspectives to study how urban indigenous youth in Ontario express themselves on Facebook when they are or believe they are at risk either physically or psychologically. Social computing is described by Farzindar and Inkpen (2015) as “an area of computer science that is concerned with the intersection of social behaviour and computational systems” (p.109). Similarly, Facebook (2016) defines social computing as “computational techniques and tools to study human social behaviour”. The field of social computing is thus comprised of two essential elements: social behaviour and the computer systems that enable this behaviour.

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Our hypothesis is that urban indigenous youth at risk use the capabilities of Facebook to communicate their at-risk situation in both explicit and implicit ways to their peers. This is particularly important given that urban indigenous youth use Facebook and other social media daily and heavily. We conducted five focus group discussions (FGDs) in the summer of 2017 with twenty urban indigenous youth in Ottawa, Canada, aged 14-35. The data generated from the discussions were coded based on patterns identified through thematic analysis (Braun, & Clarke, 2006).

Our contribution is an analysis of how urban indigenous youth at risk express themselves on Facebook. We have found that many urban indigenous youth generated and shared content on Facebook when they were or felt at risk physically or psychologically. The topics ranged from personal emotions to indigenous community issues. Most of our focus group discussion participants did not see any content in their Facebook News Feed that was relevant to risk management, health services, or public services. They could tell if one of their friends was at risk through the language or verbal tone of the content that he or she would generate or shared on Facebook. We believe that the findings from this study could be used to flag users at risk and develop Facebook News Feed algorithms that mitigate the risks of flagged users.

Background

UNESCO (2016) defines youth as the population group ranging from 15 to 35 years of age. Youth, according to that definition, are the most at risk age group in populations across societies and cultures. Transitioning through this stage of life requires coping with changes in hormones, physical state, mood, and social behaviour in their exploration of identity and quest for autonomy. Youth in vulnerable and impoverished populations face even higher levels of risk since they already have to deal with all of those transitional challenges in addition to dealing with the challenges of poverty and vulnerability.

In this research, the term “at risk” means that individuals face a high probability of being exposed to physical and/or psychological harm or danger. For this study, we focus on urban indigenous youth because they face enormous risks in terms of health care, education, housing, unemployment, racial and cultural discrimination, substance addiction, murdered and missing indigenous women, sexual abuse and domestic violence, and youth suicide (Boksa, Joobar, & Kirmayer, 2015); (Drache, Fletcher, & Voss, 2016).

We chose to narrow the geographic scope of this study to urban populations in the city of Ottawa, Ontario given that data from Statistics Canada shows that the majority of indigenous peoples in Canada live in the province of Ontario and mostly in urban areas rather than on reserves, which are often more rural and remote. Census data collected in 2011 indicates that out of Canada’s total indigenous population of 1.4 Million, 21.5 % (301,425) reside in Ontario (Statistics Canada, 2015a). This amounts to 2.4% of the population of Ontario as a whole, considerably less than the national percentage of indigenous peoples in Canada, 4.3% (Statistics Canada, 2015b). The percentage of indigenous peoples with registered indigenous status living off-reserve in Canada

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stands at 50.7% (Statistics Canada, 2015b). Many of them now live in populous urban areas of Ontario such as Toronto, Ottawa, Thunder Bay, Sudbury, Hamilton, and Sault Ste. Marie (Ontario Federation of Indigenous Friendship Centres, 2013).

Ottawa is the capital of Canada and has a population of approximately one million people (City of Ottawa, 2014). It is the seat of Parliament and is the main location of the federal government; it is where important policy decisions are made that have an impact on all indigenous communities across the country. According to the 2011 statistics, there are about 18,180 indigenous peoples living in Ottawa (Statistics Canada, 2015c). The number is quickly growing and many of the indigenous peoples in Ottawa are young with 4 in 10 being under the age of 25 (Statistics Canada, 2017). Therefore, Ottawa is a suitable location for this study as the city attracts indigenous youth from many communities within Ontario and from other provinces as well.

Given that urban centers pose significant risks for urban indigenous youth (Miller et al., 2011), it is critically important to develop an understanding of how urban indigenous youth express themselves on Facebook when feeling or being at risk. In recent years, researchers have looked at social media and Internet usage by indigenous peoples who live in rural and remote areas around the world, mainly in Australia, Canada, United States, and New Zealand (Gauvin, Granger, & Lorthiois, 2015); (Filippi et al., 2013); (Ormond-Parker & Sloggett, 2012); (McMahon, Gurstein, Beaton, O'Donnell, & Whiteduck, 2014); (Kopacz & Lawton, 2011); (McMahon, 2014); (Singleton, et al., 2009); (Watson, 2015). The purpose of social media usage among indigenous peoples includes cyber-activism (Warf, 2009); (Elwood & Leszczynski, 2013), digital channels to record and promote their culture (Huang, Chen, & Mo, 2015; Dalseg & Abele, 2015), connecting and maintaining relationships with other people (Watson, 2015), and seeking health information

as well as establishing virtual health support groups (Stephens-Reicher et al., 2011; Carlson, 2013; Laakso, Armstrong, & Usher, 2012). There is no academic literature documenting the voices of the urban indigenous youth based on how they are expressing themselves on Facebook when they feel or are at risk.

Research methodology

In the summer 2017 we conducted five FGDs with twenty urban indigenous youth, aged 14-35 who were living in Ottawa at the time. Each discussion lasted between 30 and 60 minutes. The FGD method helps to obtain qualitative insights and feedback from research participants (Kontio, Lehtola, & Bragge, 2004).

Recruitment

We recruited participants by displaying posters in indigenous organizations in Ottawa. Recruitment was also done with the help of our indigenous organization partners in Ottawa, through their internal announcements and by word of mouth. Given the unpredictable number of participants who would show up at each scheduled FGDs, one of our scheduled FGDs had only one participant. The rest of the FGDs were comprised of between two and eight participants.

Data collection

We held our FGDs in private meeting spaces located in the indigenous organizations' headquarters. At the beginning of each FGD, participants were asked to provide demographics and social media usage information by answering survey questions. The questions covered their age, gender, education, occupation, income, family status, language, indigenous title, birthplace, and the extent of their access to social media. This was followed by the FGDs, which were semi-

structured and followed discussion guidelines that allowed participants to freely express their personal opinions and to add their own comments beyond the prepared questions. The FGD inquiries focused on their personal use of Facebook; the types of content they read, generated, and shared on Facebook; their Facebook usage when they felt at risk either physically or psychologically how they felt about topics, motivations, challenges, Facebook News Feeds, and online security and privacy; their observations about what happens when fellow indigenous friends are at risk through the language or verbal tone of the content that he or she has generated or shared on Facebook; and the support of indigenous culture by generating and sharing content on Facebook. All participants were reimbursed \$40 CND for their travel expenses for participating in this research.

Data analysis

Our FGDs were performed in-person and they were audio-recorded. The data generated from the FGDs were manually transcribed in English and coded based on patterns identified through thematic analysis (Braun, & Clarke, 2006). Based on our research questions and discussion guidelines, we developed predetermined codes and then created additional codes to capture specific emergent themes as we became more familiarized with the data. Then we did second-level and third-level content analysis to identify relationships between themes. Given that the number of our discussions was not large, we were able to make comparisons between each discussion to find the similarities and differences as a means of further improving our data analysis with special attention to the participants' age and gender. In October 2017, we presented our preliminary findings to the indigenous organization partners who helped us recruit participants for this research. This process helped to enhance the quality of our findings (C. Intahchomphoo, personal

communication, October 18, 2017). In the end, we had to remove data from one participant in our FGDs, since that person did not provide his or her indigenous title in our survey questionnaires. Their data did not qualify for the study because we wanted to ensure we obtained data exclusively from urban indigenous youth. Therefore, the number of qualified participants in this study dropped from 21 to 20.

Ethics

This research received ethics approval from the Health Sciences and Science Research Ethics Board of the University of Ottawa (File# H02-17-01). We asked research participants to give written consent of their willingness to participate in the FGDs. They were given as much time as needed to read the consent form, prior to the FGDs taking place. We also read the contents of the consent form aloud to the participants prior to the start of each FGD. In the results section, we omitted all personally identifiable information including participants' names, residential areas, and physical traits. We used pseudonyms for our participants' observations reported in this paper. No data from this research was stored online in a cloud-computing environment. Data were not and will not be shared with any third parties. We informed participants that may be some psychological or emotional discomfort and social repercussions to participating in this study such as negative judgments by other FGD participants that were known or associated with this study, especially when they were asked about how they interacted with Facebook when they felt or were at risk. We provided participants with a list of indigenous organizations in Ottawa where they could seek help and support for any potential psychological or emotional discomfort that might have occurred after participating in this research. Participants did not have to answer questions that they did not want

to answer. They could decide to end or withdraw from the FGDs at any time they wished. Their participation in this study was thus completely voluntary.

Participant characteristics

Twenty urban indigenous youth in Ottawa participated in our five FGDs, nine females and eleven males, aged between 14-20 (n=13), 21-25 (n=3), 26-30 (n=3), and 31-35 (n=1). None of our FGD participants indicated other gender identities or preferred not to answer. Eleven participants reported high school as their highest academic achievement or current education, five self-identified with less than a high school education, three had a trade certificate or diploma, and one had an undergraduate degree. In terms of occupation, twelve participants in our FGDs identified themselves as students. One person was employed in an administrative and secretarial capacity. Another person worked in a professional job and two participants were in skilled trade jobs. Four participants were unemployed. Out of all of the urban indigenous youth in our FGDs, fifteen reported their annual income as less than \$10,000 CDN, three FGD participants earned between \$10,000 and \$24,999 CDN per annum, and two participants reported their income to be between \$25,000 to \$49,999 CDN per year. Sixteen of our FGD participants were single or never legally married and four participants were legally married or in common-law family status. None of the participants reported being separated, divorced, or widowed.

While English and French are the official languages of Canada, indigenous people have their own languages. All of our FGD participants speak, read, and write English. Four participants also speak French. At least one FGD participant could speak one of the following indigenous languages: Inuktitut, Algonquin, Oji-Cree, and Ojibway. In addition, Swampy Cree was the spoken indigenous language of three participants in our FGDs. Seven FGD participants said they could

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read French. Moreover, at least one person from our FGDs could read Inuktitut, Oji-Cree, Swampy Cree, Plains Cree, or Ojibway. In addition to being able to write in English participants also reported being able to write in Inuktitut, Oji-Cree, Swampy Cree, and French. According to the Indian Act of Canada, fifteen of our FGD participants were First Nations including both status and non-status, one was Inuit, and four were Métis. (See table 1 below).

Language(s): They speak (More than one selection allowed)	
Inuktitut	1
Algonquin	1
Oji-Cree	1
Swampy Cree	3
Ojibway	1
French	4
English	20
Language(s): They read (More than one selection allowed)	
Inuktitut	1
Oji-Cree	1
Swampy Cree	1
Plains Cree	1
Ojibway	1
French	7
English	20
Language(s): They write (More than one selection allowed)	
Inuktitut	1
Oji-Cree	1
Swampy Cree	1
French	1
English	20

Table 1: Language data of our twenty FGD participants

Regarding birthplace, eight participants were born in Ottawa, two were born in Moose Factory, Ontario and another two in Kingston, Ontario. The following residential areas were documented as the birthplaces of the rest of our FGD participants born outside Ottawa and each was the birthplace of only one participant: Sarnia, Ontario; Edmonton, Alberta; Iqaluit, Nunavut;

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Maniwaki, Quebec; and Regina and Lloydminster, Saskatchewan (See the map below). Two participants did not to specify their birthplaces.



Map: Birthplaces of our 10 FGD participants who were born outside Ottawa.

(Source: World of Maps (<https://www.worldofmaps.net/maps.htm>) under open access licensing, retrieved October 2, 2017)

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The twelve of the FGD participants who were born outside of Ottawa, moved between 1990 and 2017. We found our FGD participants moved to Ottawa with different motivations. Five persons moved to follow their parents, three moved for school, and two participants moved to Ottawa because they were in the foster care system. Four participants identified another motivation (one each) for moving to Ottawa: to receive health care, to live with their partner, to raise kids, and to find a job.

Regarding the methods of connecting to Facebook, our FGD participants used various devices and they also used more than one device to connect to Facebook. The FGD participants identified six technology platforms for accessing Facebook. The methods of connecting to the Internet included home Internet, Internet access in publicly funded organizations, mobile phones and free WiFi available by businesses. (See the table 2 below).

Devices (More than one selection allowed)	
Desktop computer	8
Laptop	12
Tablet	6
Mobile phone	18
Connect to the Internet in order to access Facebook (More than one selection allowed)	
Home Internet	16
Use Internet at the publicly funded organizations such as schools, hospitals, public libraries, etc.	15
Data plan on mobile phone	6
Wi-Fi at businesses	3

Table 2: Facebook connectivity data of our twenty FGD participants

All twenty FGD participants currently use Facebook and other social media tools as well including Twitter, YouTube, Google+, Pinterest, Instagram, Tumblr, SnapChat, Musical.ly, Reddit, and LinkedIn (See the table 3 below). Thirteen out of all twenty FGD participants used Facebook every day, four used it occasionally, and three used Facebook once a week.

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Social media tools (More than one selection allowed)	
Facebook	20
Twitter	6
YouTube	19
Google +	10
Pinterest	9
Instagram	15
Tumblr	2
SnapChat	4
Musical.ly	1
Reddit	4
LinkedIn	3

Table 3: Social media tools data of our twenty FGD participants

Nineteen FGD participants indicated that they used Facebook to connect and maintain relationships with other people. Nine participants used Facebook to seek information. Two participants indicated that they used Facebook for cyber-activism and to preserve and promote indigenous culture.

At the end of our survey questionnaires, several FGD participants wrote some additional comments about their Facebook usage. The comments include: *“I do not post often”*; *“I just talk to friends on Facebook and to see their posts”*; *“Not really on it much”*; *“Facebook is good for families”*; *“Family conversations”*; and *“I use Facebook to post my artwork as well as to stay connected with others.”*

Results

Urban indigenous youth frequently read, generated, and shared indigenous culture posts, shared posts about the wellbeing of their family and friends, and shared humorous posts.

“I posted my artworks on Facebook. Trying to get some responds how it looked.” (Mikom, male, aged 31-35)

“I used Facebook to message friends and also used it to look other people’s artworks like music, movies.” (Megis, female, aged 14-20)

“I posted about pow wow and anything that was going on in the [indigenous] community.” (Waabigwan, female, aged 21-25)

Facebook posts related to indigenous culture were discussed in two out of our five FGDs. This topic created interesting discussions among our FGD participants. Several participants agreed that the indigenous culture related posts on Facebook were very valuable for indigenous peoples’ online communities. Our FGD participants discussed the Powwow (also known as the indigenous peoples’ social gathering), indigenous artwork such as paintings, music, and movies as examples of indigenous culture representation mentioned in their Facebook posts.

Our five FGDs with urban indigenous youth in Ottawa also suggested that they read, generated, and shared Facebook posts about the wellbeing of their family and friends. Three FGD participants, Ishkode (male, aged 14-20), Wenona (female, aged 21-25), Nibaa (male, aged 26-30), indicated that they generally used Facebook to look at or comment on what other people posted and then would share some of those posts. Moreover, Namid (female, aged 26-30), explained in detail how she used Facebook to keep herself up to date about her family and friends’

wellbeing, *“I read everyone’s posts from my friends, my family, and my boyfriend’s family. A lot of them were sick and they posted that on Facebook”*. Interestingly, some FGD participants used Facebook as a place to store and view their family’s happy memories. As, Ishkode (male, aged 14-20) explained, *“I used [Facebook] to view family posts.”* Megis (female, aged 14-20) also described, *“I used [Facebook] to view old photos of our family. We had it pile-up. We had stuff from 2008 onward. It was like a time capsule”*.

In four out of five FGDs, eighteen participants discussed about their humorous posts on Facebook. They said that they used Facebook to read, generate and share different kinds of humorous posts. Bineshii (male, aged 14-20) explained, *“I shared other people’s memes [an amusing picture or video widely shared on social media]. They were like little comic books”*. Our FGD participants also discussed other types of humorous Facebook posts. Waagosh (male, aged 14-20) explained, *“I just posted stupid jokes [on Facebook]”*. While others explained, *“I used to use Facebook every day for finding jokes. Every morning I would post a bunch of weird things.”* (Ziibi, male, aged 31-35), and *“If someone went to the Walmart and stole their shopping carts or something like that. They posted on their Facebook like a little blog. I did not know why it was amusing for me. I liked to share them... If I looked at it and I enjoyed it, I would share it.”* (Aki, female, aged 14-20).

Personal status updates on Facebook were generated and shared differently.

Our FGD participants gave a variety of answers when they discussed whether they read, generated, or shared their personal status updates on Facebook. Zenibaa (female, aged 14-20) told us that, *“I texted people, shared pictures, and wrote what I was doing (on Facebook).”* Zenibaa posted personal status updates on Facebook all the time, as it was a normal thing to do in her everyday life. Whereas, Bineshii (male, aged 14-20) said that *“I did not share much about my personal*

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status. I posted my check-in location every once a while". Bineshii shared personal status updates less frequently but he mentioned about his check-in locations generated and shared on Facebook. However, Nagamo (female, aged 14-20) described that she rarely posted on Facebook about her personal status updates, especially not sharing Facebook posts related to her food or eating out, as *"I did not usually post what I ate because people did not care what I ate"*.

Many urban indigenous youth generated and shared content on Facebook when they were or felt at risk physically or psychologically.

"When I was upset, I needed somebody to message me to talk me out of stuff. I thought it was a good way to reach out to people asking for help." (Zenibaa, female, aged 14-20)

"If a family member died, I shared it because I knew other family members felt the same and would do the same thing [posting their sad feelings on Facebook]." (Aki, female, aged 14-20)

"Sometimes I had complex feelings or thoughts, I would reword and reformat it and then I would roll it out on Facebook or Twitter. After I put it out, I left it. I did not go back if anyone left a like or notification or anything. It was as a way to vent. Sometimes, I needed to let a few things go but not all of it." (Mikom, male, aged 31-35)

Three of our FGD participants Zenibaa (female, aged 14-20), Aki (female, aged 14-20), and Kikom (male, aged 31-35) gave us details about personal motivations for generating and sharing content on Facebook when they felt at risk physically or psychologically. Meanwhile, the rest of FGD participants intensively listened. Six out of our twenty FGD participants reported that they did not generate or share personal content on Facebook when they felt or were at risk. However, some of them noticed many of their Facebook friends did actually post content when they felt or were in danger. As, Namid (female, aged 26-30) said, *"When I was upset and very mad, I did not want to*

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touch Facebook. I did not want to share something that I would regret after ... because the whole world would see that. But everyone [her Facebook friends] was talking about their emotions on Facebook". Moreover, Waawaatesi (female, aged 21-25) put into words that *"I saw [that] my Facebook friends posted about their at-risk situations, hugely".* Immediately, Waagosh (male, aged 14-20) added to Waawaatesi's comment that, *"All the time. I scrolled down their [Facebook] posts mostly were about their depressions and sadness".*

When at risk, urban indigenous youth generated and shared content on Facebook such as text, photos, and video. The topics ranged from personal emotions to indigenous community issues. They had different motivations and no difficulties posting on Facebook when they felt or were at risk.

"Just text. I did not post photos when I was crying." (Aki, female, aged 14-20) and (Azaadi, male, aged 14-20)

"Through text, I was not going to take a photo of my face [to post on Facebook] when I felt low." (Mikom, male, aged 31-35)

"I had some friends on Facebook said they were so sad, helped me. They would also post pictures of they were crying too". (Nagamo, female, aged 14-20)

"I saw a lot of negative [Facebook] posts. Sometime there was no picture. They were just texts. Sometimes I saw videos people trying to cut or hang themselves. They were very messed up." (Wenona, female, aged 21-25)

Our FGDs showed that urban indigenous youth generated and sometimes shared content such as text, photos, and video on Facebook when they felt at risk physically or psychologically. In some

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serious cases, Facebook was used as a tool to live-stream suicide attempts among contacts within the indigenous youth population. The topics that urban indigenous youth at risk generated and shared ranged from personal emotions to critical social issues in indigenous communities. As, Zenibaa (female, aged 31-35) described, *“I lived in children services foster care. I just talked about my problems on my Facebook such as schools, friends, my day, and stuff like that. It has been three years that I lived in the foster system.”* Mikom (male, aged 31-35) classified his Facebook posts when he felt or was at risk as *“personal emotions”*. Waawasstesi (female, aged 21-25) underscored the broader trends underling the topics that urban indigenous youth at risk generated and shared on Facebook. She described the following, *“I saw a lot of stuff about indigenous girls that have gone missing. That is a huge issue in the indigenous communities. I saw posts about indigenous girls that have gone missing from North Bay and went the way to my reserve and to Alberta because I had a big network. So when I was on Facebook, I saw stuff happening all over the place”*.

Furthermore, Waawasstesi explained that her motivation for generating and sharing posts about missing and murdered indigenous women and girls was to find them. She hoped people would see pictures of the missing indigenous women and girls on Facebook and that they would recognize the faces when they saw them in person somewhere. Based on her actual experience, she spoke about her cousin who went missing when they lived together in Toronto. She and her family put a missing person post on Facebook and they also reported it to the police. People in her Facebook network urgently shared her post. The post was spread very quickly. Fortunately, her cousin came home two days later as it turned out she was just sleeping at a friend’s house. But this incident showed Waawasstesi how fast a Facebook post could spread to a wider audience. Additionally, Mikom told us of his motivation to share his personal emotions on Facebook: he believes that if

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you hold on to something – if you do not let it go – it will build up inside of you. Mikom said that wrote about his negative emotions on Facebook as a way to coping with complex emotions. Finally, none of our FGD participants reported any challenges that might prevent them from posting on Facebook when they felt or were at risk.

Many urban indigenous youth who were or felt at risk did not see any content in their Facebook News Feed that was relevant to risk management, health services, or public services. In addition, most of them did not feel concerned about their own online security or privacy on Facebook.

Eighteen participants from our five FGDs indicated that they did not see any content in their Facebook News Feed that was relevant to risk management, health services, or public services. As Aki (female, aged 14-20) said, *“I mostly saw advertisements for clothes or something like that”*. However, there were two participants who indicated that they saw risk management content in their Facebook News Feed. The first participant was Bineshii (male, aged 14-20) who told us he saw crisis hotline ads and he thought it was good information for urban indigenous youth at risk. The second participant who saw the risk management content in their Facebook News Feed was Nagamo (female, aged 14-20); she explained, *“I saw the suicide help hotline. It showed up on the side [of the Facebook page] as an ad. But sometimes it was on my News Feed. I thought it was a good thing. If someone was at risk, and they did not want talk with anyone they knew. They could just call and ended up talking with a totally stranger”*.

Among our five FGDs with urban indigenous youth at risk in Ottawa, there were sixteen FGD participants out of the total of twenty who reported that they did not feel concerned about their own online security or privacy on Facebook. As Bineshii (male, aged 14-20) described, *“My*

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Facebook did not really have much to see that I was worried about what people would see. Facebook is a platform that you needed to be open”. Also, Zenibaa (female, aged 14-20) explained to us that, “There was no point using Facebook if you were really concerned about privacy. When you posted, it would be out there. You could delete it, but some people could still screenshot them. It would practically be still out there. You could not really delete anything off the Internet.”

Namid (female, aged 26-30) expressed a different point of view. She was worried about her online security and privacy when she used Facebook but she did not give us her reasons. Conversely, Wenona (female, aged 21-25) openly discussed her online security and privacy concerns that, *“We did not know who were out there looking at your Facebook. Even it was set as private. Other people could still see your stuff because they could find a way to hack your Facebook”*. Immediately, Ziibi (male, 31-35) added his comment, *“Yes, they could use other people’s [Facebook] accounts as a way to read [your posts]”*. Waawaatesi (female, aged 21-25) also commented that, *“[She] was scared of her photos on Facebook being leaked”*.

Most urban indigenous youth could tell if one of their friends was at risk from the language or verbal tone of the content that he or she generated or shared on Facebook.

Nineteen out of twenty participants from our five FGDs responded that they could tell if one of their friends was at risk from the language or verbal tone of the content that he or she generated or shared on Facebook. Only, Zenibaa (female, aged 14-20) said no to this question, mainly because she did not usually pay attention to what other people posted on Facebook. Whereas most of our FGD participants could in fact tell, as Bineshii (male, aged 14-20) explained,

“I could tell by the way they were speaking, what their sentences were like. One of my friends, he was really super good in English. But one time he got very mad and posted on

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Facebook and his grammar was absolutely horrible. That was how I knew he was actually mad and he was not joking. Another way I could tell was [that] they used the F word swearing”.

Additionally, the following is a summary of the thoughts voiced by other FGD participants on the matter. Mikom (male, aged 14-20) said that if you knew someone, you usually also knew how they acted and what was their regular behaviour. If they posted something on Facebook that was out of character, you knew that they were going through a difficult time. Another comment was made by Nibaa (male, aged 26-30), based on his real experience with his father’s family, one of his cousins posted on Facebook asking people to please take care of his children after he committed suicide. People started commenting on his Facebook asking him not to self-harm. His Facebook post caused people to go to his house right away and they had to break the door to get into his house. His Facebook post was a cry for help. Nibba went on to say that he believes that when people post their pictures on Facebook when they are drunk, it could indicate that they were coping with a mental health problem. Another way for Nibba to tell whether some of his friends were at risk was when they did not use their Facebook for a while and then all of a sudden posted something very emotional. Then, they disappeared and came back later to post more emotional messages on Facebook.

Another comment by Namid (female, aged 26-30) revealed that some of her friends posted crazy pictures, for example showing them being very drunk or depressed. Some friends also showed on their Facebook relationship status that they had transitioned out of a relationship, and into another relationship with a different person or into and out of relationship with the same person again and again. This kind of Facebook interaction was what Namid used to tell if her friends were at risk.

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Another female FGD participant, Waawaatesi (aged 21-25) commented that she noticed that her Facebook friends who were at risk were usually the victims of bullying. It caused them to post their suicidal ideas on Facebook. Waawaatesi said that children at 13 or 14 years old are insecure and sensitive and likely victims of bullying. Another comment by Azaadi (male, aged 14-20) was that he could tell if his friends were at risk of suicide through the language or verbal tone of the content they posted on Facebook. As, he told us that, “*most of [the] people [I know on Facebook] said [on Facebook] that they did not want to live anymore*”. Most of the people he knows on Facebook have expressed the desire to die. Please note here that Azaadi (male, aged 14-20) is an Inuit youth originally from Iqaluit. He was sent to live with his grandparents in Ottawa a few years ago. His Inuit community in Iqaluit suffers from suicide epidemic among their youth populations (Chachamovich et al., 2015).

Urban indigenous youth believed that the indigenous culture supported them in posting content on Facebook. They also believed that the postings on Facebook are a way to support and promote their indigenous culture.

All our twenty FGD participants believed that their indigenous culture supported them in posting content on Facebook. Ziibi (male, aged 31-35) discussed that indigenous culture is very open to new things including Facebook. Moreover, our FGD participants also believed that the postings on Facebook are a way to support and promote their indigenous culture. As, Nagamo (female, aged 14-20) described “*Sometimes I put my beading works [on Facebook], if I beaded, I posted it [on Facebook]*”. Bineshii (male, aged 14-20) then commented that “*I posted pictures of me at pow-wows [on Facebook]*”. Zenibaa (female, aged 14-20) explained that she sometimes was even asked by indigenous organizations to post on her Facebook about what the organizations were doing to

advertise their social and cultural activities and programs for urban indigenous youth, because Zenibaa knew many indigenous youth and connected with them on Facebook. In addition, Namid (female, aged 26-30) explained her strong support toward the indigenous culture and Facebook usage that *“I always posted [on Facebook] about our culture and I wanted to share [our] indigenous culture”*.

Discussion

Study findings

We were not surprised that our study shows that most of urban indigenous youth in Ottawa are heavy users of social media. Many of them are using more than one social media platform, not only Facebook. In our FGDs, we learned that many urban indigenous youth generated and shared content on Facebook when they felt at risk physically or psychologically.

We were deeply saddened to learn from our FGDs that some urban indigenous youth had used Facebook as a tool to live stream their suicide attempts and express self-harming ideation. We believe this practise is very dangerous and requires immediate intervention. This kind of Facebook usage should not be allowed to spread, especially among vulnerable populations. However, we are pleased to hear from our FGD participants that the indigenous culture supports urban indigenous youth to generate or share content on Facebook. This is a significant motivation to continue our work on social media usage among indigenous peoples.

Our FGDs also shows that with one or two exceptions, notably Nagamo (female, aged 14-20), most of our interviewees did not see any content in their Facebook News Feed that was relevant to risk management, health services, or public services. We think this issue is worthy of being

further researched. Furthermore, our research shows how urban indigenous youth could tell if one of their friends was at risk as a result of: (i) the language or verbal tone of the content that their friend has generated or shared on Facebook, (ii) the images they used and (iii) the changes in their relationship status. We believe these indicators could be used to develop Facebook algorithms that can help identify urban indigenous youth at risk and provide them with targeted information that could help reduce the risk.

This study also shows that urban indigenous youth at risk sometimes generate and share content (text, photos, and video) on Facebook because they want to vent and seek help from others. There is a real need to develop technologies that could better detect indigenous youth at risk based on the content they post on Facebook, such as the methods used in the work on sentiment analysis by (Farzindar & Inkpen, 2015), and provide alternative information for them to feel supported in their Facebook experience such as changing their News Feed or providing them with an online referral system to access the healthcare services that they need when at-risk behaviour is detected.

The same mechanism, as mentioned above, could be applied to advertisements on Facebook. Useful information could be injected into an indigenous youth's Facebook news stream in the same way as Facebook advertisement is used to sell products, as it appears Nagamo experienced. Facebook advertisements are highly personalized, depend on users "likes", the online behaviour of users, keywords in posts and so on. For example, indigenous organizations could advertise for their crisis help services and suicide prevention interventions, under the same conditions as Facebook advertisement. The ads could target Facebook users who identified themselves as indigenous peoples, are in the youth age range, and live within the same area of the indigenous organization who promoted their crisis help ads on Facebook.

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We also argue that Facebook is not only a forum in which to communicate states of distress with friends and family, but a part of the problem in perpetuating them. Urban indigenous youth experience copycat suicides, cyberbullying, and online harassment on Facebook leading to greater at-risk situations for them. Youth in Canada who are exposed to their schoolmates' suicide were found to have increased rates of suicide ideation and suicide attempt (Swanson S. A. and Colman I. 2013). The authors' hypothesis is that social media increases the "contagion" effect. The research presented in this paper presents confirms the fact that urban indigenous youth are exposed to content related to their friends' suicide attempts on Facebook, and hence that Facebook could be expected to pose an increased risk of suicide for the urban indigenous youth. However, we think that Facebook could also be used to reduce risks as well. The Facebook News Feed and advertisement can be shown to urban indigenous youth at risk and help change their behaviour by getting them to seek help. The root causes of many social issues and problems among indigenous youth in Canada are poverty and discrimination, and social media such as Facebook is not among the root causes.

Limitations

Our study has some limitations. We restricted our FGDs only to urban indigenous youth in Ottawa with a sample size of 20. Since Ottawa is a capital city, there may be some unidentified features about this location that bias our sample. We did not conduct this research in other cities in Ontario, nor did we conduct research in other provinces and territories of Canada where many other urban indigenous youth also reside. Thus, we do not aim to report findings of all urban indigenous youth at the national level.

Conclusion

Most urban indigenous youth in Ottawa expressed themselves on Facebook when they were or felt at risk physically or psychologically. Urban indigenous youth at risk generated and shared content on their Facebook because they wanted to vent but also because they are looking for help from others. We think Facebook is a platform that could be leveraged to help reduce risk among urban indigenous youth if we can better detect how they express themselves on Facebook when at risk. We hope that the findings in this paper can assist and encourage the development of Facebook News Feed algorithms to mitigate their risks.

We want to urge researchers and government agencies to seriously look in this issue. Researchers could conduct more studies to find solutions on how to use Facebook to communicate with urban indigenous youth at risk at the time they need help the most. For government agencies, they should think about interventions and policies that we will help to improve lives of all urban indigenous youth through Facebook.

Acknowledgments

The authors would like to thank the FGD participants, for sharing their stories and their encouragement of this research and Mr. Danny Vollant, Innu indigenous scholar and candidate in Licentiate in Law (LLL) at the University of Ottawa, for reviewing the research proposal of the current study. This first author would like to thank scholarships partially used in this study: the 2016 Queen Elizabeth II Graduate Scholarship in Science and Technology. The opinions expressed in this paper are those of the authors and do not represent the views of the organizations and funders with which the authors are affiliated.

Chapter 6: ARTICLE 4

Indigenous organizations and Facebook indicators for youth at risk

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This article has been conditionally accepted at the American Indian Culture and Research
Journal.

Abstract

There is a lack of academic literature documenting the analysis of Facebook data to identify the risks that affect the wellbeing of urban indigenous youth. This research aims to determine whether the textual content of Facebook posts on the public Facebook walls of indigenous organizations could be used to identify at risk individuals among urban indigenous youth in Ottawa. Our hypothesis is that the explicit and hidden patterns of verbal behaviour within the indigenous organizations' Facebook data could be used to identify the classes of risks faced by urban indigenous youth as well as help identify which individuals are imminently at-risk. We gathered and then analyzed the Facebook activity data of two indigenous organizations in Ottawa (the Odawa Native Friendship Centre and the Assembly of First Nations) generated from January 1, 2017 until November 9, 2017 using the SAS Visual Analytics application to perform text mining, sentiment analysis, and data visualization. Our data from the Facebook wall of the Odawa Native Friendship Centre shows that the language used in these posts indicates the presence of the risk of psychological trauma among indigenous peoples of all ages living in Ottawa. In contrast, the data analysis from the Assembly of First Nations' Facebook page indicated four major risks for indigenous communities in Ottawa and across the country: 1) the threat of the extinction of indigenous languages, 2) the danger of environmental hazards, 3) the possibility of psychological trauma linked to the Canada's 150th anniversary, and 4) the risk of suicide among indigenous youth. However, we were not able to identify specific indigenous individuals at risk of suicide due to the limitations of our research ethics mandate. These restrict us from accessing the profiles of individuals who like, share, and comment on public posts and analyse this information. The risks of suicide and psychological trauma among indigenous youth are regularly mentioned in our Facebook data sample from the two indigenous organizations.

Keywords: Facebook, urban indigenous youth, text mining, mental health

Introduction

Data mining is an established research field within Computer Science that involves applying software tools for processing large datasets to identify patterns and trends. Our literature review revealed that data mining is also used for making predictions (Delen, Walker, & Kadam, 2005). In the age of big data, social media data poses challenges for data mining analysis because this technique is designed to operate on statistical data. Yet social media data is unstructured data, consisting mostly of words and phrases—not of numeric values (Nikhil, Tikoo, Kurle, Pisupati, & Prasad, 2015). A technique similar to data mining that works well with social media data is “text mining”, which has been developed specifically to process text data and is well suited to social media analysis. Text mining looks at the linguistic features in the dataset to identify patterns, including sentiment analysis to determine the opinion and emotional state of the participants and lexical analysis to find word frequency distributions (Cambria, Schuller, Xia, Havasi, 2013). Farzindar and Inkpen (2015) state that analysing language on social media has been receiving much research attention because it could have real impact on people’s daily lives. Text mining has been applied in many areas including healthcare (Popowich, 2005); (Chen, Fuller, Friedman, & Hersh, 2005), business and marketing (He, Zha, & Li, 2013); (Nassirtoussi, Aghabozorgi, Wah, & Ngo, 2014), and psychology (Reips & Garaizer, 2011); (Cheng, Li, Kwok, Zhu, Yip, 2017).

In this research, we propose to use text mining techniques to determine whether Facebook could be used to identify the risks facing urban indigenous youth in Ottawa. Our hypothesis is that the explicit and hidden patterns of verbal behaviour within the indigenous organizations’ Facebook

data could be used to identify the risks faced by urban indigenous youth. We gathered and analyzed the data from the Facebook activity of two indigenous organizations in Ottawa: the Odawa Native Friendship Centre (ONFC) and the Assembly of First Nations (AFN) generated between January 1, 2017 and November 9, 2017. This data was analysed with the SAS Visual Analytics application version 8.2 to conduct text mining, sentiment analysis, and data visualization. Both these Facebook pages are public and the privacy of participants was respected by ensuring that their identities are not revealed in this paper.

Background

Youth in vulnerable and impoverished populations face particularly high levels of risk, since they already have to deal with the typical transitional challenges of youth in addition to dealing with the challenges of poverty and vulnerability. In this research, the term “at risk” means that individuals face a high probability of being exposed to physical and/or psychological harm or danger. For this study, we focus on urban indigenous youth because they face significantly high risks in terms of health care, education, housing, unemployment, racial and cultural discrimination, substance addiction, murdered and missing indigenous women, sexual abuse and domestic violence, and youth suicide (Boksa, Joobar, & Kirmayer, 2015; Drache, Fletcher, & Voss, 2016). We chose to narrow the geographic scope of this study to urban populations in the city of Ottawa, Ontario given that data from Statistics Canada shows that the majority of indigenous peoples in Canada live in the province of Ontario and mostly in urban areas rather than on reserves, which are often more rural and remote.

The city of Ottawa has a unique concentration of a number of diverse indigenous organizations; no other city in Ontario has the same characteristics. Ottawa’s indigenous organizations look after

the basic needs and wellbeing of indigenous residents, including their housing, education, health, and culture. These functions are similar to those of indigenous organizations in other cities in Ontario, but Ottawa is distinct in being the headquarters for nine national-level indigenous organizations. At the time of writing this article, there are fifteen indigenous organizations located in Ottawa, of which nine are policy-oriented and six perform community outreach functions. Policy-oriented indigenous organizations negotiate and participate in political matters with the Canadian federal government and parliament, which are also located in the capital. Community outreach oriented indigenous organizations focus on providing support to all indigenous people living in Ottawa. The characteristics of indigenous organizations in Ottawa are unique and this positions the present study well to gather both regional and national information as indicators about how the indigenous organizations' Facebook pages could be used as a tool to identify the risks faced among urban indigenous youth. Ottawa is therefore suitable for such a study given that urban centers pose significant threats for urban indigenous youth.

In recent years, researchers have looked at the social media and Internet usage by indigenous peoples who live in rural and remote areas around the world, mainly in Australia, Canada, the United States, and New Zealand (Gauvin, Granger, & Lorthiois, 2015; Filippi et al., 2013; Ormond-Parker & Sloggett, 2012; McMahon, Gurstein, Beaton, O'Donnell, & Whiteduck, 2014; Kopacz & Lawton, 2011; McMahon, 2014; Singleton, et al., 2009; Watson, 2015). The purpose of social media usage among indigenous peoples includes cyber-activism (Warf, 2009; Elwood & Leszczynski, 2013), digital channels to record and promote their culture (Huang, Chen, & Mo, 2015; Dalseg & Abele, 2015), connecting and maintaining relationships with other peoples (Watson, 2015), and seeking health information as well as establishing virtual health support groups (Stephens-Reicher et al., 2011; Carlson, 2013; Laakso, Armstrong, & Usher, 2012). There

is, to date, no academic literature documenting the analysis of indigenous organizations' Facebook data to identify the risks that affect the wellbeing of urban indigenous youth.

Theoretical framework

Ling et al. (2015, p. 199) describes information and communications technology (ICT)-enabled community empowerment by specifically looking at the role of social media in responding to the community at risk, which the authors define as follows: “social media has three roles in enabling communities to attain collective participation, share identification, and collaborative control”. Figure 1 (below) from Ling et al. (2015) shows the role of social media in community empowerment by helping social media users to attain shared identification, collective participation, and collaborative control.

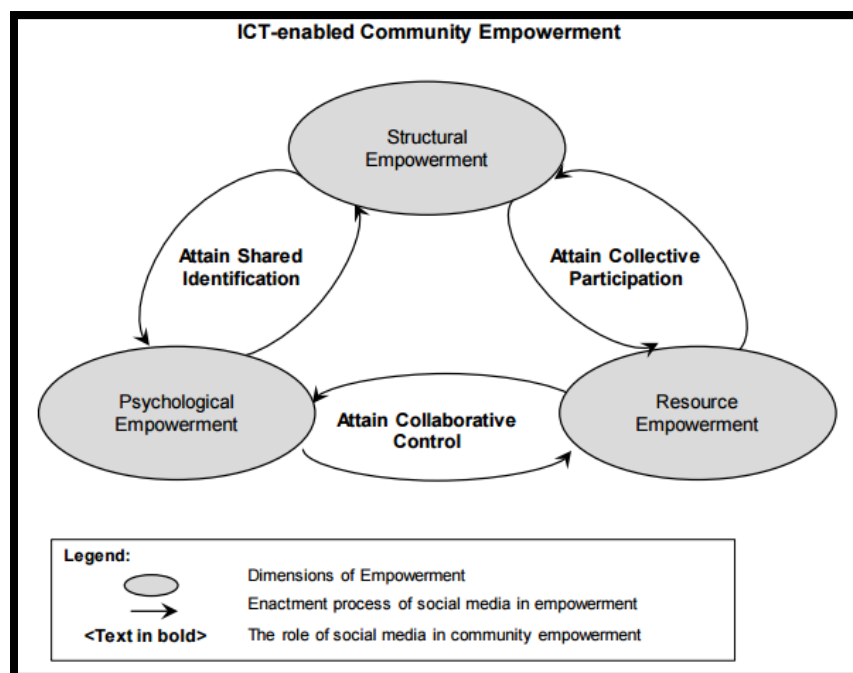


Figure 1: Ling et al. 2015's ICT-enabled community empowerment theory

The role of attaining shared identification occurs when social media connects to the group of people who are facing similar problems or share the same opinions about something. Social media enables users to form a sense of togetherness and closeness. This use of social media nurtures the unique identity formation of the group. Collective participation means that when people use social media, they systematically contribute to social media activities, even if they are not always actively posting, sharing, commenting on their own social media accounts or someone else's account. In the case of more inactive social media users, they still receive updates and notifications from other users' social media activities on their own accounts. The term "collaboration control" refers to when social media users who share the same interest belong to the same online group. They will start to interact with each other within their own social media group, leading to future offline or online actions, which are going to require them to collaboratively control and contribute to the tasks.

Each of the three characteristics of social media in community empowerment explained above can be linked with another social media function. First, the role of social media in achieving shared identification can help to empower communities to overcome both structural and psychological challenges. Structural empowerment refers to how social media enables reaching out to people who live in different locations to participate in and follow the group agenda. It changes the existing community's social and power structure in that social media now can recruit people from various zones or areas who share the same beliefs and identifications. Social media thus can empower communities to overcome psychological challenges by allowing people to freely express their thoughts. Tapping social media is thus crucial for empowering communities that usually are voiceless and vulnerable.

The second role of social media is to enable collective participation, which can empower communities with structural and resource constraints. Structural empowerment in this case refers to the situation where communities in crises can use social media in order to act more proactively to collectively solve their problems. In the past, government and aid organizations were seen as the only principal risk responders and communities had to wait for them to act and intervene. But with social media, communities are empowered to be more involved in risk management. Social media users can engage in risk management by sending and sharing information to other people, which will increase the number of people involved in solving the community crises. Next is the resource empowerment generated by collective participation in social media, in this context, “resource” means the information that generated through social media activities. This information becomes an extremely valuable resource because it can be trusted and more accurate. In the past, communities at risk had to listen to information that governments and authorities provided to them. Often, this information was not accurate and was typically motivated by some hidden political agendas.

Lastly, social media plays an important role in providing collaborative control which empowers the communities’ psychological and resource capabilities. The psychological empowerment referred to in this element arises when people collaboratively control and are involved in their community risk-management and when their social media actions raise the community’s self-esteem. They will be more confident in their own competence in managing the risk. It is very important for communities to be self-reliant and to cultivate pride in their communities. Furthermore, the resource empowerment is seen as the ability of communities to be able to control how they manage material and human resources such as volunteers and members with special

skills and expertise to help with certain tasks. Structural, psychological and resource empowerment thus contributes to the creation of a grassroots movement.

These factors in Ling et al.'s theory (2015) are important in this research because they can be applied to urban indigenous youth and their communities in Ottawa. Using Ling et al.'s theory (2015) in this context can serve as a guide to conducting a pilot study to identify indigenous youth at risk as a function of their use of social media. Furthermore, Ling et al.'s theory (2015) discusses untrusted communication between the authorities and communities in risk situations. This element is applicable to the real situation of indigenous peoples in Canada based on their past experiences with the government. This paper attempts to apply Ling et al.'s original theory (2015) to social media community empowerment specifically among the urban indigenous youth at risk in Ottawa.

Research methodology

Research design

This research analysed Facebook wall posts in sample indigenous organizations from Ottawa. The representative for local level indigenous organizations in Ottawa is the ONFC since the focus of their social program work is to help indigenous peoples living in Ottawa. At the national level, the AFN is chosen because their policy-oriented mandate is to unite all indigenous peoples across Canada to collectively negotiate with the Canadian government. Their Facebook content covers the nationwide interests of all indigenous communities whereas the ONFC has a more local purpose.

Data collection

The data about the activity patterns on the publicly available Facebook pages of the ONFC and the AFN was analysed using the SAS Visual Analytics application version 8.2. These pages are completely public in exactly the same way any web page is public and accessing this data does not require the researchers to have a Facebook account. He et al. (2013) used a similar method of data collection for harvesting data about large pizza chains' Facebook and Twitter pages and they too used a text mining application for both the raw data collection and the text analysis.

Data analysis

The SAS Visual Analytics application was used to perform text mining, sentiment analysis, and data visualization to find the major topics of our sample Facebook data in order to draw some conclusions about the hidden patterns related to the potential risk-trends in the indigenous community. We used SAS Visual Analytics to identify six major topics detected from each Facebook data sample along with and provide us with sentiment analysis that shows the levels of positive, neutral, and negative words used in each topic and their word frequency distributions.

The next phase of our text mining analysis was to manually code every post in all six major topics detected from the Facebook walls of the ONFC and AFN to find themes linked to the risks that indigenous individuals are facing. Before the thematic analysis, we read all posts to familiarize ourselves with the data; this would later help us to identify relationships between topics.

Then, we examined our findings to see if there was any textual evidence of risks that we had previously identified (Intahchomphoo, Vellino, Gundersen, 2018, under review) as affecting urban indigenous youth specifically by analyzing the Facebook activity data of the ONFC and the AFN

generated from January 1, 2017 until November 9, 2017 (the day we began collecting the sample data). We analyzed the data to see if it did or did not capture the current situation with indigenous communities. Some data was collected manually since they are already available on the Facebook walls of the ONFC and the AFN including the number of people who liked, followed, visited, and reviewed their Facebook pages, and the number of photos and videos in their Facebook albums. In addition, we used the website - www.sociograph.io - to calculate the number of posts and comments for both samples, since this type of data is not available directly from Facebook. Referring to the date of their first Facebook post, we manually scrolled down all posts on their Facebook pages until we found the oldest post.

Ethics

This research received ethics approval from the Health Sciences and Science Research Ethics Board of the University of Ottawa (File# H02-17-01). We were not permitted to access the profiles of those individuals who like, share, and comment on public posts or use their information as data. The analysis of the Facebook data preserves the anonymity of users by removing all personally identifiable information (name, Facebook ID, profile photo, date, and location) associated with comments. We were not permitted to publish or to share the collected data.

Sample characteristics

Based on the level of engagement with the public on their Facebook accounts, the AFN has a much higher numbers of likes, follows, visits, and comments on their Facebook page than the ONFC. However, both of them have similar numbers of reviews and ratings (See table 1).

Table 1: The level of engagement of the ONFC and AFN's Facebook

	ONFC (As of November 9 th 2017)	AFN (As of November 9 th 2017)
URL	https://www.facebook.com/Odawa.Friendship	https://www.facebook.com/AssemblyofFirstNations/
Number of likes	3,451	47,073
Number of follows	3,419	46,163
Number of total visits (from people who clicked on their paid ads on Facebook within 28 days of our data collection)	864	511
Number of reviews by the public	56 with a rating of 4.5 out of 5 stars from the reviewers.	69 with a rating of 4.3 out of 5 stars from the reviewers.
Number of photos in their albums	360	2,042
Number of videos in their albums	1	4
Number of posts	1,711 (Post types: 304 photos, 95 videos, 509 links, 623 statuses, and 180 events)	2,840 (Post types: 847 photos, 120 videos, 1.7K links, 123 statuses, and 18 events)
Number of comments	291	3,048
Date of first post	December 20, 2011	January 3, 2012

Results

The figures below are the visualizations of the most frequently used terms and phrases from the ONFC and AFN's respective Facebook data shown as word clouds and bar charts. The right word cloud is a visual representation of single words in our text dataset. Each keyword is shown with different font sizes based on the frequency of the word. Additionally, in the left bar charts, the sentiment of terms and phrases were measured based on the level of positive, neutral, and negative words used in the major topics identified automatically by the SAS Visual Analytics application. These figures show the most relevant data for identifying themes linked to the risks that indigenous peoples are facing.

At the bottom of both the ONFC and AFN text mining analysis results also include the sentiment value, date and time published, type of Facebook message (post, comment, reply), and the number of shares and likes. It is noticeable that the text sentiment analysis of the ONFC's Facebook wall mostly consists of the neutral vocabulary counts displayed as the orange bars. However, the Facebook posts from the AFN page present a much higher number of negative words presented in blue bar charts in several topics (see figure 1 and 2). In this context, the positive, negative, and neutral words become evident what Facebook users like or do not like. By focusing on the sentiment documents, indigenous organizations can find opportunities to advocate for their peoples. We also counted and identified the French words.

Figure 2: Text mining analysis on the ONFC's Facebook wall

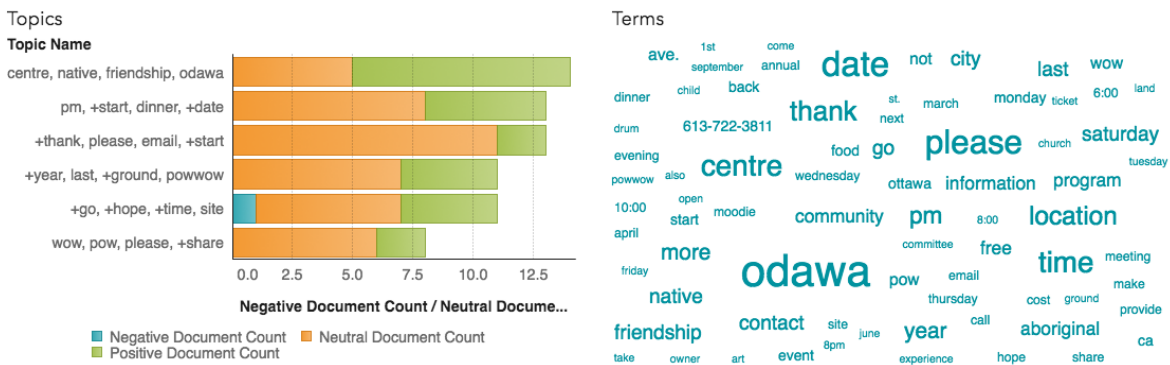
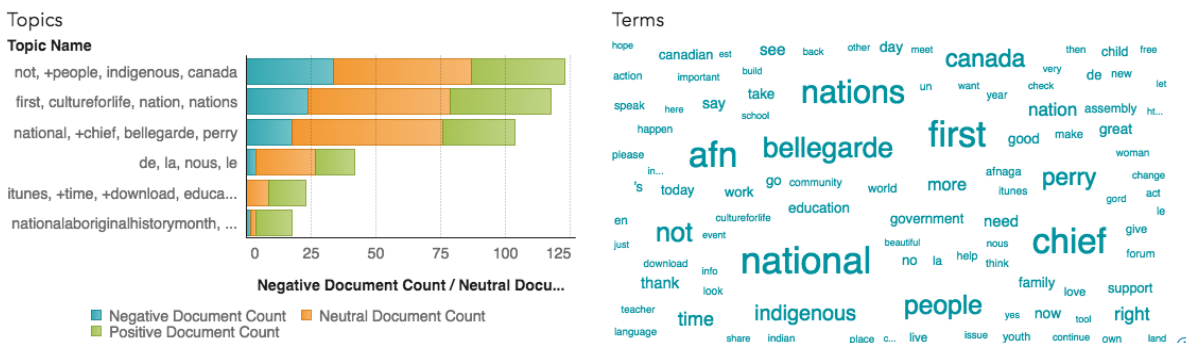


Figure 3: Text mining analysis on the AFN's Facebook wall



The next phase of our text mining analysis was to manually code every post in each topic detected from the Facebook walls of the ONFC and AFN to find themes linked to the risks that indigenous peoples are facing through thematic analysis (Braun, & Clarke, 2006). First, we read all posts. When we became more familiarized with the data, we developed predetermined codes and then created additional codes to capture specific emergent topics. We think the tool was pertinent and helpful to identify topics related to indigenous peoples' wellbeing.

Text mining analysis of the ONFC's Facebook posts

The ONFC's Facebook data revealed only one theme related to the risk among indigenous peoples in Ottawa concerning their psychological trauma. Many posts we found on the ONFC's page contained data that were related to the name of the organization, the organization's contact information, and the announcements of activities run by the ONFC.

The risk of psychological trauma

Our data identified psychological trauma as a risk to which indigenous peoples of all ages living in Ottawa were exposed. The ONFC introduced social activities from both indigenous and non-

indigenous cultures to improve their peoples' wellbeing such as yoga classes, indigenous art, spiritual healing with elders, and powwows (indigenous social gatherings). For examples, a post from ONFC invited people to get help with their psychological trauma with indigenous elders says,

“Odawa Native Friendship Centre Circle of elders gathering - time of re-awakening healing - our aboriginal way. Inviting aboriginal community members... Aboriginal, First Nation, Metis, Inuit women, youth ages 13 & over, two-spirit [indigenous third-gender], LGBTQ, 60s scoop, or anyone who has experienced violence, physical and/or mental. Elders will be on site along with trauma specialists. We are hoping to have a sacred fire...”

This post was liked by seven persons and shared by three. Data indicated that the powwow is referred to as a way for the ONFC to help people to improve their wellbeing. Powwow was mentioned 21 times. Discussions on the Facebook wall of the ONFC show that powwows help strengthen indigenous peoples' spirituality. When the ONFC shared the poster for the Odawa powwow 2017, it was quickly liked by 115 persons and shared 273 times.

Text mining analysis of the AFN's Facebook posts

The AFN's Facebook data shows there are four themes related to the risks among indigenous peoples in Ottawa and other areas across the country including: the risk of extinction of indigenous languages; the risk of environmental hazards; the risk of psychological trauma linked to Canada's 150th anniversary; and the risk of suicide among indigenous youth.

The risk of extinction of indigenous languages

Many indigenous languages are endangered (Norris, 2007). The risk of extinction of indigenous languages causes great concern for all indigenous communities. Our data indicates indigenous

peoples discussed the revitalization of indigenous languages on the AFN's Facebook page. The risk of extinction of indigenous languages poses a great danger to building resilience in indigenous communities. The AFN's National Chief posted a message on the organization's Facebook page on March 31, 2017, National Indigenous Languages Day, as follows:

“Only three Indigenous languages will survive if we don’t take immediate and drastic action. We must take that action. All our Indigenous languages are national treasures spoken nowhere else in the world. Indigenous languages are an essential element of our right to self-determination. I want to hear our old people whisper the ancient words of the ancestors into the ears of our babies. I want to see our young people conversing in our languages.”

The Chief's post was liked by 33 persons and shared 22 times. Another message by the Chief was posted on the AFN's Facebook on June 16, 2017 related to the risk of extinction of indigenous languages written as:

“Revitalizing First Nations languages is a vital part of self-determination. Language is culture and central to our songs, stories, and ceremonies. The recognition, promotion, and recovery of First Nations languages - the original languages of these lands - will not only strengthen our Nations but enrich the whole country.”

Many Facebook users commented on the AFN's Facebook page regarding the risk of extinction of indigenous languages. One person shared their experience when they tried to obtain government services in indigenous languages explaining, *“I walked into [an] Employment Insurance [EI] benefits office in Yellowknife and only English and French no Indigenous language no indigenous people in the EI office which I am not happy...”*. Another person expressed the opinion that

indigenous languages revitalization should start with federal government legislation saying, *“The policies that caused the damage need to be actively reversed and a language revitalization bill is a good place to start”*. Another person supported the idea of the bill by commenting that: *“Indigenous language protection law...YES...now speak to your MP about drafting it up, have the Senator peruse it and if it fits the Bill, tell your MP to move on it”*. Moreover, the AFN added a statement indicating that the risk of extinction of indigenous languages also needs support from non-indigenous peoples to help address the issue, *“It is important and encouraging that the majority of Canadians understand the need to promote and revitalize Indigenous languages”*.

The risk of environmental hazards

The AFN National Chief posted a message on the organization’s Facebook page for Earth Day on April 21, 2017,

“Mother Earth is warming. She needs our help to heal so that we can all stay healthy and continue to enjoy the beauty and riches she provides. First Nations have both rights and responsibilities to the lands and waters ...”.

On May 29, the Chief posted another message to express his concern over a dam project stating,

“The federal governments’ approach to the Site C dam project in British Columbia is contrary to our rights in Canada’s own Constitution and the UN Declaration on the Rights of Indigenous Peoples”.

The dam project poses high risks of environmental hazards such as floods, property damage, and damage to ecosystems. The indigenous communities that are situated near the dam will be put in jeopardy of resettlement and relocation. Furthermore, several people discussed the risk of

environmental hazards on the AFN's Facebook page. They believe that environmental problems in indigenous communities are often caused by the Canadian government's policies. One person discussed the government and their close ties with the energy industry,

“Nor do I support the government's [policies] to destroy Mother Earth for oil and gas industry, Northwest fracking, Northwest forest clear cutting in the Northwest Territories. Give land title back to the Deh Cho First Nations. Government systems are still failing...”

Another person commented on the AFN's Facebook about the drinking water advisories for many indigenous reserves across Canada. The reserves are areas set aside for indigenous peoples according to legislation passed by the Canadian Government. Most reserves in Canada are small, rural, and sometimes remote pieces of land disconnected economically and lacking in public facilities such as hospitals and universities. The drinking water problem occurred on many reserves because of low funding for water treatment and sanitation technology from the federal government, which one person expressed as

“It is beyond disgusting that there is anyone in Canada who has spent their entire lives under a water advisory. Advisories are meant to be temporary measures taken in an emergency, not a permanent part of the status quo”.

This is one example of many environmental hazards is believed to be caused by the government's policies. Furthermore, one Facebook user suggested that the Canadian government build emergency evacuation centers to help indigenous communities that are affected by environmental hazards. The post commented, *“This is the very reason why we are proposing to build an emergency evacuation center project that will give our people a safe haven during disasters like this [forest fire] ...”.*

The risk of psychological trauma link to the Canada's 150th anniversary

The 150th anniversary of Canada's Confederation was on July 1, 2017. Our data indicated that the nationwide celebration poses a risk of psychological trauma among indigenous peoples because they were reminded of the historical mistreatment of indigenous peoples by the Canadian government. The issue also touches on the history of colonization. One person commented on the Facebook wall of AFN on January 8, 2017 that, "*Canada has been part of indigenous history for so long, yes not just 150 years, indigenous people may not be the majority as in some countries where majorities rule...*". A similar post explained that,

"150 Canada. 150 years they have been bullying us. Stole our children. Raped our women. Took away our language, and beat [us up with] the Catholic religion. Made us feel that we don't belong here. We have been here more than 150 [years], so go ahead and celebrate your 150 [years] of torching us poor First Nations. We will celebrate that we survived your crap".

Moreover, one Facebook user posted on the AFN's Facebook page asking for equal treatment and positive change for indigenous peoples from the government of Canada on the 150th anniversary of the establishment of the country. The person wrote on January 27, 2017 that,

"It's 2017 and the Canada's 150th Anniversary of Confederation. It's right time, about time and almost time that First Nations all issues should be resolved as soon as possible. The families of the survivors of Indians residential schools should be given all facilities and they should be given free education until post-graduation. Government of Canada should try to create extra jobs for them. Whose ever are drug addicted their treatment should be

promptly started. Now there is no more time for indigenous peoples to live like 10 decades back. They should be equally treated.”

Another person commented on the AFN’s Facebook on January 27, 2017 with a simple sentence saying, “*We will not celebrate Canada Day [the national holiday on July 1]*”.

The risk of suicide among indigenous youth

Our analysis identified the risk of suicide among indigenous youth. One person expressed his or her thoughts on the AFN’s Facebook public page that “*Suicide is prevalent among the Native people. I love all our youngsters. We have so many (youth suicide attempts)*”. While another post discussed the abuse in foster care settings that pushed many indigenous youth to think about ending their lives,

“Way too many deaths and negligent foster homes. Workers do not do regular home visits. They do that to parents but not the foster homes. Children being beaten, sexually abused, starved, [and] mentally abused. Most foster parents are not being paid properly and [they] take it out on the kids. Overcrowded because there are not enough homes to place them, young [indigenous] girls and boys being sold for sex. Girls getting abortions because the foster father raped them and the child care system hiding it ...”.

Furthermore, the AFN launched a social media campaign to raise awareness about the indigenous youth suicide crisis on World Suicide Prevention Day, September 10, 2017. The AFN asked indigenous youth to submit a short email with some photos explaining how their indigenous culture has helped them to maintain and improve their mental health and mitigate suicidal thoughts in order to give hope to other indigenous youth in danger of suicide. Selected submissions were

posted on all of the AFN's social media accounts including their Facebook page with the hashtag of #CultureforLife. This social media campaign was designed to as a response to the indigenous youth suicide crisis and celebrates experiences of resilience by sharing positive messages and photos. Hopefully, when indigenous youth at risk read those posts, they will feel more optimistic and supported by their own indigenous communities and culture and they will avoid self-harming behavior. Our data indicated that there were 22 posts on the AFN's Facebook with this hashtag. Those suicide prevention posts got 749 likes and were shared a lot by 182 persons. The following sample submissions from indigenous youth to support the World Suicide Prevention Day were shared on the AFN's Facebook page:

- *“Connects with culture by knowing her path and participating in the MMIW [missing and murdered indigenous women] inquiry...”*
- *“Dry meat making to provide for my family. My greatest gift my grandmother ever gave me: the gift of culture and the gift of traditions.”*
- *“My way of life, it keeps me grounded and connected. I enjoy being out on the land just like my late father...”*
- *“I am realizing how rich and vibrant our culture is. It certainly brings me peace.”*
- *“My culture is my life: attending a Buffalo kill before the Sundance. The meat was used to feed 600 people in the camp for 5 days.”*
- *“Being a mother is greatest gift and highest honour. My son is growing, living, and breathing proof of strength and resilience.”*
- *“I think all young Mi'kmaq and other tribes should engage more in their culture because it can heal them and help them through tough times. When I am feeling down I listen to powwow music and it brings me to a good mood again.”*

Discussion

Study findings

We could not identify the demographics of Facebook users who commented, replied, or liked the posts of indigenous organizations' Facebook posts due to the privacy constraints imposed by the research ethics approval. Therefore, we cannot not demonstrate that the people who posted textual evidence of behaving as though they are at risk of depression, anxiety, speaking about death or suicide, are in fact indigenous youth. One reason is that there is very little difference in the use of language between indigenous youth posting something about themselves that indicates that they are at risk, versus an indigenous elder or someone else who is expressing concern about suicide rates among indigenous youth and posts something about it on Facebook.

Here is a fictitious example: an indigenous middle-aged man comments on AFN's public Facebook page that he is very worried that his 16-year-old son is going to commit suicide after a relationship breakup. Another indigenous teenager replies to the man's comment that he also just ended a romantic relationship with someone and is actually thinking of ending his life as well. In this hypothetical case, both of them would have generated and shared similar life-threatening keywords posted on the AFN's public Facebook page. Computers and even humans would not be able to know which person is actually the indigenous youth without also having access to the Facebook demographic data about them such as their age, based on the date of birth that they input, their profile photos, Facebook friends, etc. Therefore, our hypothesis is not fully supported. However, as shown in section 5, we were able to detect evidence from the population as a whole for the presence of risks of anxiety, depression and suicide. We were also able to detect the presence of concern for the risk of extinction of indigenous languages, the risk of environmental hazards to the

indigenous communality, the risk of psychological trauma linked to the Canada's 150th anniversary, and the risk of suicide among indigenous youth as a whole. An analysis of the publicly available data from Facebook pages of indigenous organizations could be used to identify the risks among urban indigenous youth residing in Ottawa. However due to our research ethics approval, we cannot determine that the people who posted on these Facebook walls actually live in Ottawa. They could be from anywhere in Canada. Therefore, it is not possible for us to make definitive conclusions about the provenance of these posts.

We also want to further discuss some risks that were identified in the results of only one indigenous organization in our study. It is the risk of psychological trauma linked to Canada's 150th anniversary that emerged in our data. Overall, we saw and heard positive messages about the event both in online and offline channels. These messages of celebration were widely disseminated in the mainstream media with identification of the financial contributions from the government, businesses, and non-indigenous organizations. The positive side of the celebration ended up contrasting with the voices of indigenous peoples who thought about the event differently. This shows how social media and text mining helped us to learn about this different perspective. We know from Ling et al. (2015)'s ICT-enabled community empowerment theory that social media helps vulnerable and disempowered people to be heard. In this study we see that Facebook enables indigenous peoples to freely express their thoughts and concerns, which in turn, has heightened awareness about indigenous issues within other population groups with different ethnicities and racial backgrounds. However, in this case study the ethnic and racial identities are not the primary characteristics that serve to identify the community of interest as described in Ling et al. (2015). Rather, the identifying characteristic is the shared values regarding indigenous rights in Canada. In this instance, the structural empowerment (as described by the theory of Ling et al. (2015)) of

indigenous peoples arises from their use of social media to express a shared identification in political and social justice positions.

In addition, within our dataset from the AFN's Facebook account we noticed several critical comments in response to the AFN's posts that expressed personal feelings and opinions towards how indigenous peoples are not being treated fairly by the Canadian government as compared to other visible minority groups in Canada, particularly recently arrived migrants or refugees. Although most of those comments do not fall into the themes of our data analysis in this paper because they do not show a strong link to the risks that indigenous youth are facing, they do point to another form of social injustice that they believe they suffer from – discrimination against indigenous peoples by the government in favour of minority immigrant populations in Canada.

Normally, we hear and read about the injustices perpetrated by the Canadian provincial and federal governments towards indigenous peoples through the residential schools, land rights, and poor health care access. But we do not often hear much criticism by indigenous peoples about how they are treated compared to other minority groups. We think this is a concern that deserves to be investigated, albeit with some caution since it is a very sensitive topic. Canada is considered to have one of the most multicultural populations in the World, especially in the big cities.

Additionally, the risk of suicide and psychological trauma among indigenous youth is the commonly shared risk in our Facebook data sample from two indigenous organizations. Recently, some indigenous communities in Canada have declared a state of emergency over the suicide epidemic among their youth populations (Barker, Goodman, & DeBeck, 2017). Government agencies, NGOs, indigenous organizations, and researchers are working to improve the mental health of indigenous youth across the country whether they live in cities, rural, or remote locations.

Urban indigenous youth in Ottawa are also exposed to the dangers of suicide and psychological trauma. This finding builds upon and agrees with our other three research projects conducted prior to the research reported upon in this paper.

In our systematic literature review on social media and digital divides among indigenous peoples (Intahchomphoo, 2018), we found that indigenous youth seeking health information and establishing virtual health support groups on social media often have to deal with the suicidal thoughts and mental illnesses. This paper takes these findings further and shows that indigenous organizations in Canada are working to assist the youth whose lives are at risk by using Facebook to connect with them and promote suicide prevention services and mental health supports. This is a pressing issue among indigenous youth not only in Canada, but also among indigenous youth in Australia according to the studies surveyed in our literature review. Some indigenous organizations in Australia are also using Facebook to connect and provide assistance to indigenous youth in danger.

Secondly, in (Intahchomphoo, Vellino, & Gundersen, under review) we reported the results of a qualitative study in which we held four interviews with two communications managers and two youth program managers of three indigenous organizations with offices in Ottawa. Our data showed that indigenous organizations use Facebook because many of the urban indigenous youth in Ottawa are using Facebook and it is the fastest way to connect with them when they are or feel in peril. Suicide and some forms of mental distress are shown to be one of the major risks facing urban indigenous youth in Ottawa. The present paper further develops our findings reported on the interviews with communications managers and youth program managers. It shows that text mining techniques could help to identify the major themes in social media discussions among indigenous

peoples and highlight their real voices. Government agencies could use that information to change or improve the policies they are working on to help indigenous communities and researchers could use the information to produce research that will improve the wellbeing of indigenous peoples.

The publicly available data on the indigenous organizations' Facebook accounts can help government agencies gain insight into indigenous peoples' needs. This is a similar approach to when businesses use text mining techniques to gain consumers' insights in order to see demand trends in the market and ensure that they develop a product or service that people want to buy. Another use of text mining in private companies is to find what they could adjust in their current products and services that people think it is not working or serving their needs. The same approach of text mining in businesses can be adapted into the work of government agencies as well, for example those offering services that deal with the welfare of indigenous youth.

Thirdly, in (Intahchomphoo, Vellino, & Gundersen, 2018, under review) we reported the results of a qualitative study in which we organized five focus group discussions in Ottawa with twenty urban indigenous youth aged 14-35. The findings demonstrate that many urban indigenous youth generated and shared content on Facebook when they felt at risk either physically or psychologically. Alarming, we learned that Facebook was used by some urban indigenous youth at risk as a tool to live stream their suicide and self-harm attempts. The present paper takes our findings from the focus group discussions with indigenous youth further. The findings show that indigenous organizations are very worried about the wellbeing of their youth. Suicide and psychological trauma are not only issues among urban indigenous youth in Ottawa. We found comments that people posted on the indigenous organizations' Facebook pages from other locations as well. In the future we need to conduct more focus group discussions with indigenous

youth outside Ottawa, in other provinces both in cities and rural or remote locations. It is important for us to know more about how other indigenous youth interact with Facebook when they feel or are at risk.

Our study results are consistent with the conceptual framework of Ling et al.'s (2015) theory as applied to contemporary social media and suggest that Facebook can be used by indigenous community members in Canada to empower their communities and get more involved in individual and societal risk management. Indigenous cultural practices and historical experiences encourage people to support each other as much as possible. Our mixed methods approach shows that the presence of the risk of psychological trauma exists among urban indigenous youth living in Ottawa.

Recommendations for future research

Our research makes significant contributions to the field of indigenous studies and computation in social work. We argue that social media may be a viable source of data, depending on the purpose of study. In this paper, we could not show that the people who posted textual evidence indicative of being at risk of depression, anxiety, speaking about death or suicide, are in fact indigenous youth because we did not have any demographic information about the posters. However, we were able to detect evidence from the population as a whole demonstrating the presence of risks of anxiety, depression and suicide. If your research project aims to investigate problems within communities at large, then social media is definitely a relevant and viable source of data. Social media data has a lot of unfiltered first person experiences. People tend to speak their mind without fear or worry on social media, unlike when they are asked to answer a research questionnaire or survey.

Researchers seeking to text mine such data should select social media pages of community organizations that allow all of their posts and comments to be publicly available. It is also important to choose social media pages that many peoples have been following and engaging with. Normally, you can also look at the frequency with which community organizations post messages on their social media walls to encourage public discussions and debates. Our experience with text mining research found that some community organizations do not actively update their social media pages with new information. As a result, they do not have a high level of engagement with people in their community. Using less active pages, researchers would not have enough data to identify content patterns for research use.

Researchers also must keep in mind when they report findings in their study that all personally identifiable data of social media users must be strictly protected and redacted including names, profile photos, past locations, and connected people on social media. Researchers must respect their privacy and try to minimize unknown risks for their wellbeing. However, if researchers encounter data with extreme political and social views including racist or sexist comments, they should report it in their papers if such data pertains to their research objectives. In our opinion, it is not the researchers' responsibility to control what individuals say and share publicly on social media. It is important for researchers to be ready to engage with difficult discussions taking place on social media, as they reflect important social conversations that are occurring in wider society.

In this paper, some of what we are able to detect regarding psychological trauma can be applied to any population of social media users. The risks of anxiety, depression and suicide can happen to people of all races, ages, genders, countries, educational backgrounds, and incomes. This text mining study shows that we can rapidly learn about psychological trauma happening within a

certain community by analysing the community social media data. Government agencies and community workers could use text mining technologies to listen to the voices of peoples in their catchment areas on Facebook as demonstrated in this paper and consider this data when developing policies and interventions. Government agencies and community workers should also promote programs and services via Facebook and other popular social media in order to reach to individuals and communities at risk.

Limitations

Our study has some limitations. We restricted our analysis to two indigenous organizations' Facebook pages with offices in Ottawa. We did not conduct this research with other Facebook pages of indigenous organizations located in other cities in Ontario, nor in the other provinces and territories in Canada where many other indigenous youths also reside. Thus, we do not aim to report findings on all indigenous organizations' Facebook activities on the national level. However rich data was recovered in this research by using Ottawa as a location as we gained data from both a local level organization and a national level group.

Conclusion

From our data in this text mining paper, we conclude that analysing the information publicly available on the Facebook pages of the indigenous organizations could help to both detect and understand in greater depth, the risks facing indigenous peoples, particularly from Facebook walls that are very active. This is based on how often the organizations post information on their Facebook pages, and how the public react to their posts through sharing, commenting, reviewing, and liking. Those Facebook interactions help to generate useful data for the analysis of the risks amongst urban indigenous youth. However, the hypothesis is not fully supported. Our Facebook data could only be used to identify the risks among urban indigenous youth but it could not identify specific at-risk individuals because we had no demographic information about the posters as a consequence of limitations of the ethics guidelines for this research.

Acknowledgments

The authors would like to thank Mr. Danny Vollant, Innu indigenous scholar and candidate in Licentiate in Law (LLL) at the University of Ottawa, for reviewing the research proposal of the current study. This first author would like to thank scholarships partially used in this study: the 2017 Queen Elizabeth II Graduate Scholarship in Science and Technology. The opinions expressed in this paper are those of the authors and do not represent the views of the organizations or funders with which the authors are affiliated.

Chapter 7: DISCUSSION

An important objective of this thesis is to determine whether Facebook could be an effective tool to identify and assist urban indigenous youth at risk. In addition, the thesis aims to determine whether or not to recommend whether Facebook's News Feed algorithm should bias the news items and Facebook posts of urban indigenous youth at risk with helpful news items and positive posts from their Friends' walls.

Summary of the main findings

The first article, "Indigenous peoples, social media, and the digital divide: A systematic literature review", provides the theoretical foundation for the thesis proposal to focus on urban indigenous youth and their Facebook usage during at-risk situations. As a result of the research in the article, I found that:

- There are four primary objectives for which indigenous peoples use social media:
 - 1. Cyber-activism;
 - 2. Digital archives to preserve and promote their culture;
 - 3. Connecting and maintaining relationships with other peoples;
 - 4. Health education and virtual health support groups.
- There are five themes of the digital divide that indigenous peoples are facing with social media:
 - 1. Remote and rural;
 - 2. Low socio-economic status;

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- 3. Hardware and software;
 - 4. Digital content; and
 - 5. Age and culture.
- A need is evident for more empirical research on the digital divide experienced by indigenous peoples who live in urban areas.
- Recently, there have been a lot of discussions about suicide and the mental health crisis among indigenous youth in Canada and we urgently need more research on how indigenous youth express themselves on social media when they feel or are at risk.

The second article, “Connecting with youth at risk: Indigenous organizations use of Facebook”, shows the Facebook interactions and online relationships between urban indigenous youth and indigenous organizations. Through this research, I observed that:

- Facebook is used to engage with urban indigenous youth at risk among indigenous organizations that provide social programs and outreach.
- Urban indigenous youth in Ottawa are using Facebook to combat their loneliness by contacting their families and friends who reside in rural and remote communities.
- Indigenous organizations are also aware of the risks that indigenous youth experience every day in cities and look to Facebook feeds to help mitigate these risks.
- When indigenous organizations in Ottawa create Facebook campaigns for local indigenous youth they address the broad diversity of indigenous cultures, languages and dialects by

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creating language independent Facebook posts with few words and focus more on images and videos.

For the third article, “Facebook usage among urban indigenous youth at risk”, I listened to the voices of urban indigenous youth and how they use Facebook. Below is a summary coding table of the focus group discussions, showing how the coding process was carried out and how the themes were derived.

Major themes	Main sub-themes
Frequently read, generated, and shared posts	• Personal posts • Indigenous culture posts
Personal status updates	• General updates • Checked in at a location
Generated and shared content when at risk	• Reaching out to people to ask for help • Posting about sad feelings • Expressing complex feelings or thoughts
Content formats and topics when at risk	• Texts, photos, videos or live-streaming • Personal emotions: crying, asking for help, school and friend problems, cutting or hanging themselves • Indigenous community issues: living in foster care, missing and murdered indigenous women and girls
See risk management content in Facebook News Feed when at risk	• No: mostly advertisements • Yes: crisis/suicide hotline ads
Concerned about online security or privacy on Facebook	• No: a platform that you needed to be open • Yes: a way to hack
Could tell if one of their friends was at risk from the language or verbal tone of the content	• Grammar • Out of character between offline and online • Posted pictures when they are drunk or depressed • Change of Facebook relationship status • Suicidal ideas
Indigenous culture supported in posting content on Facebook	• Open to new things • Support and promote indigenous culture

Table 1: Summary coding table of the focus group discussions

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As a result, I learned that:

- Many urban indigenous youths in Ottawa generated and shared content on Facebook when they felt at risk either physically or psychologically. The topics ranged from personal emotions to indigenous community issues.
- Urban indigenous youth at risk generated and shared content on their Facebook in the form of text, photos, and videos because they wanted to vent their frustrations. At the same time, they were looking for help from others.
- Alarming, we learned that Facebook was used by some urban indigenous youths at risk as a tool to live stream their suicide attempts and self-harm.
- Urban indigenous youths could tell if one of their friends was at risk in a variety of ways: (i) through the language or verbal tone of the content that their friend has generated or shared on Facebook, (ii) through the images they used and (iii) from their changing relationship status. These indicators could be used to develop Facebook algorithms that can help identify urban indigenous youth at risk and provide them with targeted information that could help reduce their risk.

In the fourth article, “Indigenous organizations and Facebook indicators for youth at risk”, I performed a text mining analysis of public Facebook data available on the walls of indigenous organizations generated from January 1, 2017 until November 9, 2017. As a result of this experiment, I found that:

- The data from the Facebook wall of the ONDF indicated the presence of only one risk related to the psychological trauma among indigenous peoples of all ages living in Ottawa, including

the youth. However, the data from the AFN's Facebook indicated the presence of four major kinds of risks for indigenous communities in Ottawa and across the country including the risks of: extinction of indigenous languages; environmental hazards; psychological trauma link to Canada's 150th anniversary celebrations; and suicide among indigenous youth.

- The risk of suicide and psychological trauma among indigenous youth are the commonly shared risks in our Facebook data sample from the two indigenous organizations.
- The main hypothesis of this chapter is only partially supported. Our Facebook data could only be used to identify the risks by analysing the information that is publicly available on the Facebook pages of indigenous organizations. The limitations of the research ethics mandate could not enable the identification of individuals at risk who posted about suicide and mental illness on Facebook or to identify the precise demographic to which they belong.

In the subsection entitled, "data analysis" in Article 4, I observed that the automatically generated themes matched with the manually detected themes. Another technique that I did not use in my study is supervised classification. This technique requires first setting up a list of terms for each theme and then instruct the text mining application to gather the predefined terms that fit in the hierarchical code frames. This could have been a more effective text mining technique than the unsupervised clustering algorithm I used for handling the Facebook data in the fourth paper. It would have presented more useful terms in the word cloud related to the risks facing by urban indigenous youth without requiring an in depth human reading of all the Facebook posts and comments.

The sentiment analysis functionality of the SAS tool enables words and terms are given numerical values of positive, negative, neutral. My study did not find the sentiment analysis was done

correctly by the SAS tool. In Article 4, a majority of words were tagged with a neutral sentiment and a few with a negative sentiment. But the manually detected themes are mostly negative. The sentiment analysis functionality of SAS was not sufficiently informative when applied to the dataset discussed in the fourth article.

In conclusion, all four articles in this thesis are interconnected, each aiming to answer the research questions posed at the outset. These findings could be used in algorithm development to bias news posts and suggest relevant advertising on the Facebook pages of urban indigenous youth at risk. In addition, the main findings of this thesis attest that Facebook at the time that this research was performed can certainly be an effective tool to assist urban indigenous youth at risk. Indigenous youth do express themselves about their mental health, their well-being issues, and their life challenges on Facebook using text, videos and photos. This it is very different from the past when people preferred to keep their frustration and negative feelings to themselves or wrote thoughts down on a piece of paper or in personal diaries in which case no one would know the person was actually at risk. But social media technologies like Facebook have enabled and rendered socially acceptable a greater degree of open and emotional expression about events that happen in real time.

This thesis reported on the online interaction between urban indigenous youth at risk and Facebook and those findings in principle could be useful in the identification of individuals in danger and how to provide them with proper assistance by pointing them to social services they urgently need. Another purpose of the thesis is to determine whether or not to recommend whether Facebook's News Feed algorithm should bias the news items and Facebook posts by urban indigenous youth at risk with helpful news items and positive posts from their Friends' walls. My research findings

indicate that the algorithm could be biased with positive news items, mainly to moderate the extreme emotions that urban indigenous youth experience when they are at risk. This newsfeed bias would help to remind them of good things in life, for example when they see images or posts from people that they love or care about or are reminded of happy experiences of the past that they had with family members. The Facebook “Memories” feature is just such a mechanism that could be triggered by this proposed positive bias.

Beyond suggesting positive information on Facebook’s News Feed, postings could also be about the healthcare and social services available in nearby locations or upcoming social events organized by the indigenous communities. Many of our research participants wanted Facebook to introduce such News Feed algorithm to help urban indigenous youth at risk. It has the potential to mitigate the risks incurred by all young people - both indigenous and non-indigenous - in Canada and around the world.

Unexpected findings

The first unexpected finding was that there is a lack of research about urban indigenous youth in Canada and other countries related to their social media usages. This situation was revealed when conducting the systematic literature review. A lot of works focuses on remote and rural indigenous communications worldwide. But in fact, nowadays there is a wave of migration among indigenous peoples from remote and rural areas to urban areas, particularly among the youth, and research is needed to address this phenomenon.

The second unexpected finding occurred when interviewing communication managers and youth workers of the indigenous organizations in Ottawa. We learned that many indigenous youths living in Ottawa experienced remote-to-urban forced migration. Many of them came involuntarily to

Ottawa in order to receive medical care not available in their remote home communities. Unfortunately, they are not able to return to their reserve communities because of the length of their treatment. Often, this forced migration also made them unaccompanied youth migrants. They had to migrate to Ottawa without being under the care of a parent or legal guardian. Consequently, some urban indigenous youth in Ottawa are forced to live alone for long periods of time without family interactions, which amplifies their existing risks.

The third unanticipated finding from our focus group discussions with urban indigenous youth in Ottawa was that we found that Facebook was used by some youth at risk as a tool to live stream their suicide and self-harm attempts.

Integrating study results into the conceptual framework

In summary, this thesis is based in part on the psychological theory of empowerment in the theory of Ling et al. (2015) and each article both extends and contributes to the work on structural empowerment and resource empowerment. This work is therefore an application of Ling's theory in a contemporary social media situation, documenting and analyzing how Facebook has the ability to empower indigenous community members in Canada to get more involved in risk management on both individual and societal levels. Indigenous cultural practices and historical experiences encourage people to support each other internally as much as possible without relying on external help, particularly from government agencies. This thesis shows that the concept of ICT-enabled community empowerment is demonstrated to be applicable during at-risk situations to urban indigenous youth, youth social workers, and indigenous organizations in Ottawa who use Facebook to build resilience and community capacity to help and support the youth who are identified to be at risk on Facebook.

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The methodologies used in this work may also serve as a model for other studies on the use of Facebook with at-risk populations. The mixed methods we used for data collection, namely interviews with communication managers and youth social workers at the indigenous organizations and focus group discussions conducted with urban indigenous youth at risk, produced powerful voices and genuine insights about the real impact and adoption of Facebook within indigenous communities in Ottawa during at-risk situations. The surveys with urban indigenous youth in Ottawa helped me to better understand their demographics and their modes of access to social media including their modes of Internet connectivity and their ownership of computer devices. However, the text mining techniques applied to publicly available Facebook datasets did not enable me to identify the demographic of indigenous people who post on these public spaces due to the limitations included with the ethics approval. This is an important lesson for other academic researchers considering attempting similar text mining techniques for their projects. The ability to access and utilize datasets plays a significant role in any text mining task.

The significant findings in this thesis suggest that many urban indigenous youths do generate and share content on Facebook when they feel at risk physically or psychologically. Yet they do not see any content in their Facebook News Feed that is relevant or helpful to them for managing that risk, such as pointers to health and public services. This investigation discovered that there are indicators such as the verbal tone of Facebook posts and images as well as changes in relationship status that could be used to help identify at risk youth and provide them with helpful information. The research results also reveal that Facebook is a part of the problem insofar as it is a channel for such behaviours as cyberbullying, online harassment and the spread of harmful memes. From the point of view of theory, my results show that there is a missing element in Ling's theory of collaborative control because Facebook users do not always have a two-way interaction in order

to bring the at-risk person to get help offline. Friends who noticed other friends who are at risk will sometimes inform community first responders who then contact the individuals in danger to offer the help that is available at their organization or refer them to services at other indigenous organizations or government agencies. Therefore, the findings in this thesis enhance the theory of Ling by adding the community information responder as a new element that enables urban indigenous youth at risk to get care via a multi-way communication. As the at-risk individuals did not directly interact with the community information responder on Facebook, they are in fact being referred by their own Facebook friends. The figure below shows the adapted theoretical framework of the Ling's ICT-enabled community empowerment after with our additions in blue.

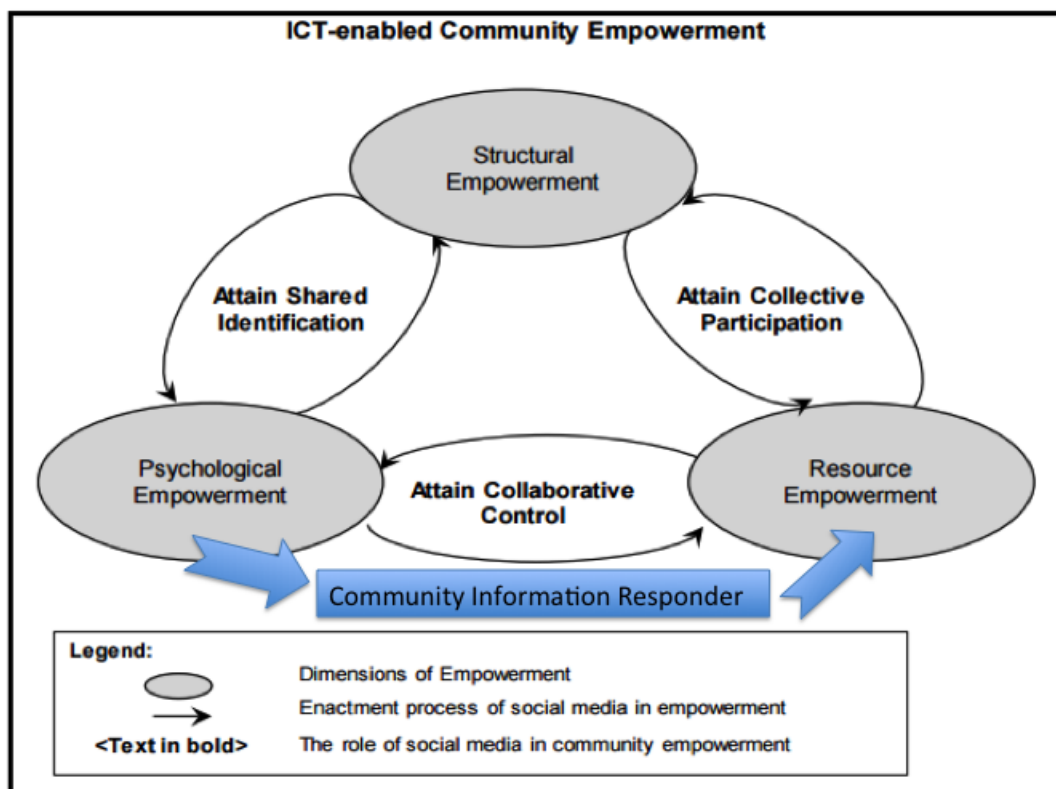


Figure 1: After Ling et al. (2015)'s ICT-enabled community empowerment theory

Moreover, the research findings in this thesis also touched on the darker side of social media usage by urban indigenous youth in Ottawa including the live-streaming suicide attempts and cyberbullying on Facebook. Any account of behaviour on social media must not ignore the theories about the aspects of social media that make them untrustworthy, for example, Baccarella, Wagner, Kietzmann, & McCarthy (2018) have explored some of the darker facets of social media functionality and analysed their relationships (see figure 2 below). They describe social media as having seven functionalities that can contribute to harm: conversations, sharing, presence, relationships, reputation, groups, and identity. Applying Baccarella et al.'s theory (2018) to the findings thesis shows that the way that some urban indigenous youth in Ottawa use Facebook to share with other people about their self-harm activities or the spreading of harmful or hateful messages by others about them falls under the negative action of "sharing" as described in Baccarella et al.'s theory. The inappropriate distribution of messages and some of the Facebook content mentioned by some of my research participants, would be very shocking for many people if they saw, for example, the self-harm videos or pictures of (especially) indigenous children. Importantly, Baccarella et al.'s (2018) theory of the dark side of social media indicates that future research projects about indigenous youth need to consider theories on both bright and dark sides of social media.

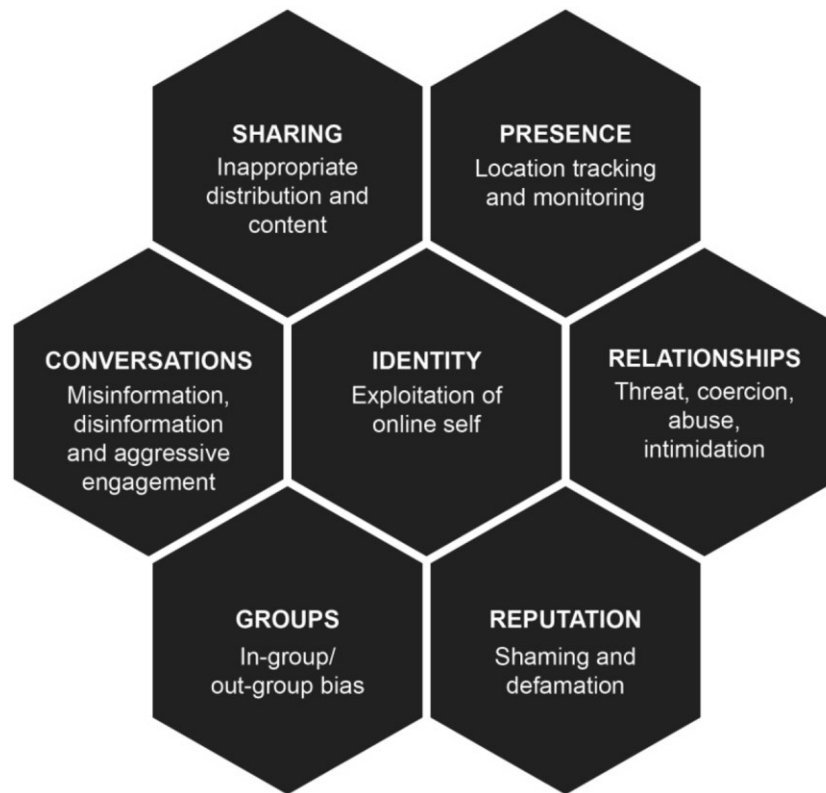


Figure 2: Baccarella et al. (2018)'s dark side of social media functionality theory

While conducting this research project and I noticed that many academic researchers in all disciplines but particularly from the health sciences and social sciences seem to design their research projects in a way that views indigenous peoples as a group that is always in crisis. In my opinion, this research practice reinforces negative stereotypes about indigenous peoples worldwide in both academic and non-academic communities. In fact, indigenous peoples have shown extraordinary resilience in the face of adversity and discrimination. Because there is so much published research that views indigenous peoples negatively, I encourage other researchers, especially those researchers who are from outside these communities (such as myself), to design

their research projects from the outset with a view to applying theories that emphasises the resilience of indigenous communities and the successes they have had in sustaining their culture.

Limitations

My thesis has some limitations. I restricted my study only to urban indigenous youth in Ottawa. Since this is the capital city of Canada, there may be some unidentified features about this location that bias the sample population in my study. I did not conduct this research in other cities in the province of Ontario, nor did I conduct research in other provinces and territories of Canada where many other urban indigenous youth also reside. Thus, I do not aim to report findings that necessarily apply to all urban indigenous youth at the national level. However, Ottawa was unique as a study location in that it allowed us to collect information from both local and national indigenous organizations in the same city.

Another limitation of this thesis is found in the first article of the systematic review. In that review I only searched for journal articles in academic databases. I realise in retrospect that this is not consistent with indigenous research methodologies. Indigenous ways of knowing recognize other forms of knowledge acquisition and dissemination besides peer-reviewed journal articles or conference proceedings, including films, oral histories, knowledge of community leaders, and paintings. Also, by not including books the systematic review (Article 1), I missed several related materials that were recommended to me during the peer-review process. If I had to redo or create another systematic review of the literature about indigenous peoples and technologies, I would include the views of community stakeholders by contacting indigenous scholars or respected community leaders to review my works and asking them what relevant materials, in any formats, that I may have neglected in my initial draft. This additional step would both ensure that my work

respects traditional indigenous pedagogies and epistemologies and increase the scope of a comprehensive systematic review.

Other assumptions and threats to the validity of my research results include the size of subject population. Five focus group discussions with twenty urban indigenous youth in total and three interviews with four social workers and communication managers were conducted to obtain the results in this thesis. It is possible that if I had run more focus group discussions and interviews I might have obtained more reliable and definitive data that better support my hypotheses.

Another limitation to the validity of these research findings is the data collection methodology. During the focus group discussions with indigenous youths, we often talked about mental health issues and social media. In retrospect, I think that for some of my research participants it would have been better to offer them the option of a one-on-one interview so that they could more freely express their first-hand experiences to me privately. Not all of the participants were fully comfortable sharing their personal stories in front of other people. As a result, they may have ended up not sharing their full stories with me even though they might have wanted to. I may have missed an opportunity to collect useful data to help to advance technologies to detect suicidal thoughts on social media.

Another type of limitation to the validity of my research findings is related to the identity characteristics of research participants and the researcher. Even though I successfully recruited both male and female urban indigenous youth to equally contribute to my research, I am aware that none of these indigenous youth self-identified as a lesbian, gay, bisexual, transgender, and queer (LGBTQ). It would have been valuable to have such data since LGBTQ youth are at high risk of cyberbullying and discriminations due to their sexual orientation. Also, not all groups of

indigenous titles living in Ottawa were equally represented in my research, for an example, there was only one Inuit youth in my research population. Lastly there is the limitation that results from the fact that I am not an indigenous researcher. I could not directly analyze the data through the lens of an indigenous perspective and there is no doubt that many research questions that I did not explore would have arisen for me had I also been a member of the indigenous community. The best I could do under the circumstances was to rely on help from other indigenous scholars and community members to ensure I interpreted the data that I did obtain correctly.

Chapter 8: CONCLUSION

Contributions

Article 1, “*Indigenous peoples, social media, and the digital divide: A systematic literature review*”, contributes by identifying the gaps in studies related to urban indigenous youth and their social media usages that are in subject areas beyond cyber-activism, connecting to friends and families, etc. Researchers should study in greater depth how these indigenous youths use social media when in danger. Article 2, “*Connecting with youth at risk: Indigenous organizations use of Facebook*”, contributes to the literature by adding the voices of communication managers and youth social workers at the indigenous organizations in Ottawa. This article helps us to further understand how these groups use Facebook to connect with urban indigenous youth at risk in the real-world situations. Article 3, “*Facebook usage among urban indigenous youth at risk*”, contributes knowledge about how the urban indigenous youth themselves interact with Facebook when in peril including their observations regarding how their friends expressed themselves on Facebook when their lives were in an at-risk situation. For Article 4, “*Indigenous organizations and Facebook indicators for youth at risk*”, we applied a text mining application to public data from indigenous organizations’ Facebook pages. The article contributes documentation on a new way to obtain the voices of indigenous peoples, including the youth that could be rapidly implemented. This article added a text mining study applied to the social media of indigenous communities for the purpose of social research, which is rare since this technique is usually applied in a business context.

In term of the theoretical contributions, this thesis provides empirical evidence to support the Ling et al. (2015)’s ICT-enabled community empowerment theory (Figure 1).

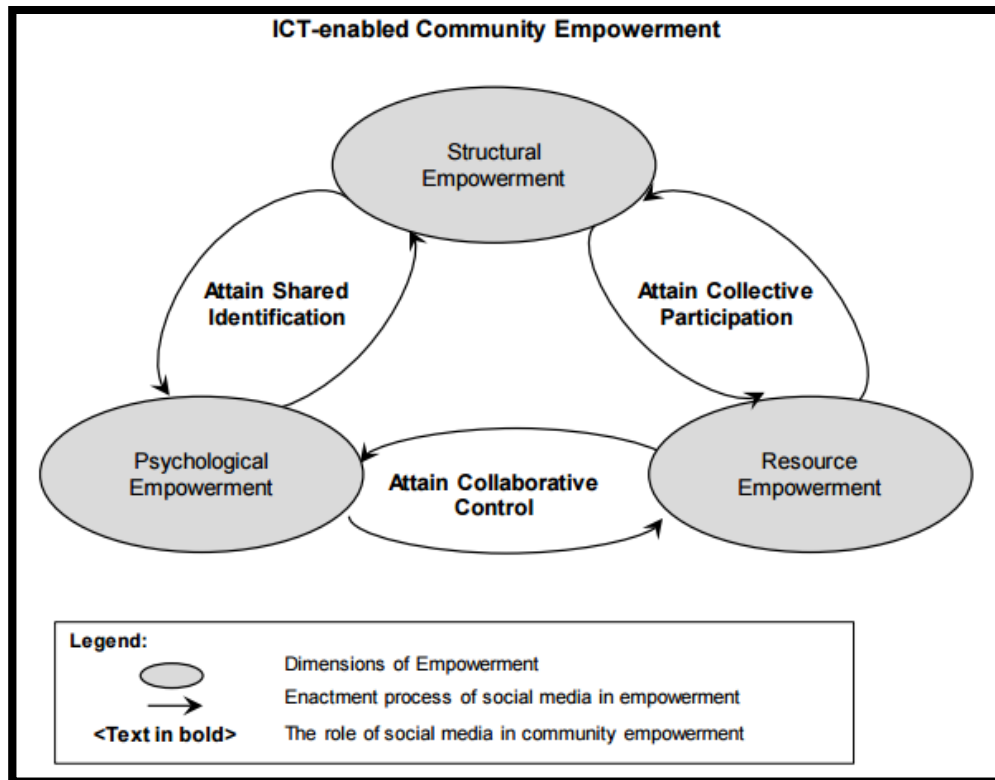


Figure 1: Ling et al.)2015(’s ICT-enabled community empowerment theory

Psychological empowerment dimension

The findings in Article 1, “*Indigenous peoples, social media, and the digital divide: A systematic literature review*”, reflect the social media usage objectives of indigenous peoples which can include: cyber-activism; digital archiving to preserve and promote their culture; connecting and maintaining relationships with other peoples; and seeking health information and establishing virtual health support groups. Each objective has a link to the psychological empowerment theory described by Ling. The literature review demonstrated that social media is known to help indigenous peoples to conveniently connect and share their experiences on the Internet with both indigenous peoples and non-indigenous populations who reside either in the same community or

in remote locations. Social media has a great impact on their psychological wellbeing, as discussed in the literature.

In Article 3, “*Facebook usage among urban indigenous youth at risk*”, presents further results used in discussion of the application of the Ling’s theory. Article 3 builds on the concept of psychological empowerment. In Article 3, we interpret the data obtained through fieldwork from urban indigenous youth in Ottawa. The findings reveal that urban indigenous youth tried to help their friends who are at risk, based on the contents their peers generated and shared on Facebook. Our participants as individuals acted like social workers, as described in Article 2. They attempted to engage with the person in danger to mitigate the risks by commenting and texting on Facebook, calling the person on the phone, and trying to meet the at-risk person face-to-face. While they were trying to make their friends feel better, they also encouraged them to seek proper help from their family members, indigenous organizations, and government agencies.

Structural empowerment dimension

A good example to illustrate the point that social media has had a great impact on the structural empowerment of indigenous peoples is found in Article 1. In the Idle No More movement indigenous activists posted their political campaign messages via social media tools like Facebook to local residents, thus rapidly expanding their reach to national and international audiences. As a result, the Idle No More movement gained many non-indigenous supporters. Ling’s theory could therefore be applied to study how the indigenous activists and their social movement support both indigenous and non-indigenous individuals as a group of people who share the same identification. This thesis does not perform such a study because we want to focus solely on indigenous peoples’ interactions on social media during at-risk situations. There is a lack of empirical research in this

area and it would be timely to conduct such a study in Canada. In the first article, I found many papers that presented findings about indigenous activists and their social movements, particularly the Idle No More movement. I did not want to duplicate those studies but I did incorporate the question about social media usage for social change into the questionnaire survey that every focus group discussion participant had to fill in before the discussion began. Findings from the survey about social media usage for social change objectives among indigenous peoples are reported in the third article.

In this situation, ethnic and racial identities are not the characteristics used to classify people in the Ling's theory. The relevant identification is about how they share the same opinions toward the indigenous rights in Canada, enabled by social media platforms that encourage the participants in grassroots movements to freely express their thoughts. In addition, the Idle No More movement has changed a lot of things in term of social structures and has brought more awareness to indigenous issues (Duarte, 2017). Now we see more Canadians from diverse ethnicities and racial backgrounds paying closer attention when the government introduces new indigenous policies and programs. This is therefore a form of structural empowerment for indigenous peoples in politics attained through shared identification in the use of social media by indigenous peoples as described by the theory of Ling.

Article 3 also touches on the structural empowerment aspect of the Ling's theory. For instance, Facebook allows urban indigenous youth to act like first responders when the lives of some of their fellow members are put on the line, which it is normally the responsibility of youth social workers who are better trained and have more experience. Facebook also changes the social and power

structures discussed in Ling's ICT-enabled community empowerment theory because Facebook facilitates the creation of more peer-to-peer support groups among urban indigenous youth.

Article 4, "Indigenous organizations and Facebook indicators for youth at risk", presents the findings that indigenous peoples generated and shared their concerns about the risks that indigenous communities are facing on the Facebook pages administrated by the indigenous organizations in Ottawa. Many posts make demands for social and political changes. This is an initial stage of the real structural empowerment in Ling's theory, even though many issues that they are facing and demanding changes about have not yet fully improved. This research has established that Facebook helps indigenous peoples to freely express themselves and put forward their concerns to Canada's governmental agencies and to the Canadian public. This kind of Facebook usage among indigenous peoples can be interpreted in Ling's theory yielding both psychological empowerment and structural empowerment.

Resource empowerment dimension

In Article 2, "*Connecting with youth at risk: Indigenous organizations use of Facebook*", we noted that youth social workers in indigenous organizations in Ottawa use Facebook to both connect with the urban indigenous youth at risk and to offer assistance. Social workers interact with youths that are potentially at risk on Facebook if they notice on their personal or organizational Facebook accounts that someone has expressed negative feelings or experiences. In some cases, other people reported this to social workers if they believed someone who was posting was at risk. Social workers would then engage with the youth at risk on Facebook to calm them down and encourage them to receive help from the indigenous organizations such as housing, medical treatment, social support groups, and police assistance. According to the theory of ICT-enabled community

empowerment when social workers and urban indigenous youths at risk interact with each other on Facebook and these interactions subsequently lead to offline actions, this is a process of collaborative control on social media and illustrates interconnection between psychological empowerment and resource empowerment.

Future research

The research presented in this thesis could be replicated in other cities across Canada where groups of indigenous youth are living or migrating. Other big cities in Ontario, such as Toronto and Thunder Bay, would be good candidates. Toronto is the biggest city in Ontario with a high degree of cultural diversity and it is the financial hub for the country. Indigenous youth in Toronto will have to face a lot of financial inequality and intercultural communication challenges, which might cause increased risk. Thunder Bay has recently been spotlighted in the news for indigenous youth suicide, drug addiction, and racial bullies in the local schools. Thunder Bay is the closest city for indigenous peoples in remote and rural Northern Ontario communities to migrate to when seeking opportunities in urban areas. During a recent trip to Thunder Bay, I witnessed tensions between indigenous peoples and Thunder Bay resident who are of European descent. I think proper research is needed to look into this problem in order to find solutions. The research would probably gain from being conducted by an indigenous academic. Researchers could talk to both indigenous and non-indigenous peoples to find fair solutions for both sides. On the national level, I think this research should be conducted with urban indigenous youth in every major city in every province of Canada, especially Saskatchewan, Manitoba, British Columbia, and Alberta where the indigenous populations are large. Facebook could benefit from the findings, but they could help development of other social media platforms as well, such as Instagram and Twitter.

Recommendations for policy and practice

- Government agencies could use the text mining technologies to listen to the voices of the indigenous peoples on Facebook as explained in Article 4, “Indigenous organizations and Facebook indicators for youth at risk” for their policy development.
- Urban indigenous youth should be the main target groups for the government’s programs. Most indigenous peoples in Canada now live in the cities. Government agencies should promote programs and services via Facebook and other main social media so that appropriate information can reach them.
- Indigenous organizations and government agencies could identify urban indigenous youth at risk using social media, since many express their emotions openly on social media.

Currently, there is a paucity of empirical academic studies in the social computing area at the intersection of Facebook use and indigenous peoples. My thesis, consisting of fieldwork and text mining results, shows how urban indigenous youth interact and communicate through Facebook. We expanded Facebook’s research on social computing, text mining, and computer human interaction. This contributes to increasing Facebook research in the area of positive social change and equality for minority and vulnerable populations and helps to improve communication and understanding between indigenous peoples and social workers, governments, and NGOs by using Facebook data to better understand the risks of urban indigenous youth.

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APPENDICES

Appendix A: Interview guideline

1. How often does your organization use Facebook?
2. How does your organization use Facebook?
3. What kinds of content does your organization read, generate, and share?
4. Does your organization generate and share content on Facebook to urban indigenous youth who feel at risk physically and/or psychologically? (If no, go to question #5)
 - How does your organization prefer to generate content: as text, photo, or video?
 - What kinds of topics?
 - What are the motivations?
 - What are the challenges?
5. Can your organization tell if an urban indigenous youth is at risk through the language or verbal tone of the content that he or she has generated or shared on Facebook?
6. Does the indigenous culture support your organization to generate or share content on Facebook?
7. Anything else that you would like to share with us?

Appendix B: Focus group discussion guideline

1. How often do you use Facebook?
2. How do you use Facebook?
3. What kinds of content do you read, generate, and share?
4. When you feel at risk physically and/or psychologically,
 - Do you generate and share content on Facebook?
 - How do you prefer to generate content: as text, photo, or video?
 - What kinds of topics?
 - What are your motivations?
 - What are the challenges to posting?
 - Do you see any content in your Facebook News Feed that is relevant to risk management, health services, or public services?
 - Do you feel concerned about your own online security and privacy issues?
5. Can you tell if one of your indigenous friends is at risk through the language or verbal tone of the content that he or she has generated or shared on Facebook?
6. Does your indigenous culture support you to generate or share content on Facebook?
7. Anything else that you would like to share with us?

Appendix C : Survey questionnaires for focus group participants

1. Demographics

1.1 Age:				
18-20 ☐	21-25 ☐	26-30 ☐	31-35 ☐	
1.2 Gender:				
Female ☐	Male ☐	If you do not see your gender in the list, please fill in the blank	Prefer not to disclose ☐	
1.3 Education: (highest achievement or current education)				
Less than high school ☐	High school ☐	Trade Certificate or Diploma ☐	Undergraduate Degree ☐	Postgraduate Degree (Masters and PhD) ☐
Other ☐				

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1.4 Occupation:				
Student ☐	Unemployed ☐	Administrative & Secretarial ☐	Business ☐	Sales & Customer Service ☐
Skilled Trades ☐	Professional ☐	Other (please specify).....		
1.5 Income:				
Less than \$10,000 ☐	\$10,000 - \$24,999 ☐	\$25,000-\$49,999 ☐	\$50,000-74,999 ☐	\$ 75,000 or more ☐
1.6 Family Status:				
Never legally married (single) ☐	Legally married (and not separated) or common-law ☐	Separated, but still legally married ☐	Divorced ☐	Widowed ☐

1.7 Language (s): You speak ... (more than one selection allowed)	
Algonquian languages: - Algonquin ☐ - Atikamekw ☐ - Blackfoot ☐ - Cree languages - Swampy Cree ☐ - Plains Cree ☐ - Woods Cree ☐ - Malecite ☐ - Mi'kmaq ☐ - Innu/Montagnais ☐ - Naskapi ☐ - Ojibway ☐ - Oji-Cree ☐	Athapaskan languages : - Carrier ☐ - Wetsuweten ☐ - Chilcotin ☐ - Dene ☐ - Tlicho (Dogrib) ☐ - Gwich'in ☐ - North Slavey (Hare) ☐ - South Slavey ☐ - Slavey ☐ - Sarcee ☐ - Beaver ☐ - Sekani ☐ - Kaska (Nahani) ☐ - Tahltan ☐ - Northern Tutchone ☐ - Southern Tutchone ☐
Iroquoian languages - Mohawk ☐ - Cayuga ☐ - Oneida ☐	Salish languages - Shuswap (Secwepemctsin) ☐ - Thompson (Ntlakapamux) ☐ - Halkomelem ☐

FACEBOOK USAGE AMONG URBAN INDIGENOUS YOUTH AT RISK IN ONTARIO

		- Lillooet ☐ - Okanagan ☐ - Squamish ☐ - Straits ☐		
Siouan languages - Dakota ☐ - Stoney ☐		Tsimshian languages - Gitksan ☐ - Nisga'a ☐ - Tsimshian ☐		
Wakashan languages - Nootka (Nuu-chah-nulth) ☐ - Haisla ☐ - Heiltsuk ☐ - Kwakiutl (Kwak'wala) ☐		Inuit languages - Inuktitut ☐ - Inuinnaqtun ☐ - Inuvialuktun ☐		
Michif ☐	Haida ☐	Kutenai ☐	Tlingit ☐	English ☐
French ☐	Other (please specify).....			
1.8 Language (s): You read ... (more than one selection allowed)				
Algonquian languages: - Algonquin ☐ - Atikamekw ☐ - Blackfoot ☐		Athapaskan languages : - Carrier ☐ - Wetsuweten ☐ - Chilcotin ☐ - Dene ☐		

FACEBOOK USAGE AMONG URBAN INDIGENOUS YOUTH AT RISK IN ONTARIO

- Cree languages - Swampy Cree ☐ - Plains Cree ☐ - Woods Cree ☐ - Malecite ☐ - Mi'kmaq ☐ - Innu/Montagnais ☐ - Naskapi ☐ - Ojibway ☐ - Oji-Cree ☐	- Tlicho (Dogrib) ☐ - Gwich'in ☐ - North Slavey (Hare) ☐ - South Slavey ☐ - Slavey ☐ - Sarcee ☐ - Beaver ☐ - Sekani ☐ - Kaska (Nahani) ☐ - Tahltan ☐ - Northern Tutchone ☐ - Southern Tutchone ☐
Iroquoian languages - Mohawk ☐ - Cayuga ☐ - Oneida ☐	Salish languages - Shuswap (Secwepemctsin) ☐ - Thompson (Ntlakapamux) ☐ - Halkomelem ☐ - Lillooet ☐ - Okanagan ☐ - Squamish ☐ - Straits ☐ - ☐

FACEBOOK USAGE AMONG URBAN INDIGENOUS YOUTH AT RISK IN ONTARIO

Siouan languages - Dakota ☐ - Stoney ☐			Tsimshian languages - Gitksan ☐ - Nisga'a ☐ - Tsimshian ☐	
Wakashan languages - Nootka (Nuu-chah-nulth) ☐ - Haisla ☐ - Heiltsuk ☐ - Kwakiutl (Kwak'wala) ☐			Inuit languages - Inuktitut ☐ - Inuinnaqtun ☐ - Inuvialuktun ☐	
Michif ☐	Haida ☐	Kutenai ☐	Tlingit ☐	English ☐
French ☐	Other (please specify).....			
1.9 Language (s): You write ... (more than one selection allowed)				
Algonquian languages: - Algonquin ☐ - Atikamekw ☐ - Blackfoot ☐ - Cree languages Swampy Cree ☐ Plains Cree ☐ Woods Cree ☐ - Malecite ☐			Athapaskan languages : - Carrier ☐ - Wetsuweten ☐ - Chilcotin ☐ - Dene ☐ - Tlicho (Dogrib) ☐ - Gwich'in ☐ - North Slavey (Hare) ☐ - South Slavey ☐	

FACEBOOK USAGE AMONG URBAN INDIGENOUS YOUTH AT RISK IN ONTARIO

- Mi'kmaq ☐ - Innu/Montagnais ☐ - Naskapi ☐ - Ojibway ☐ - Oji-Cree ☐	- Slavey ☐ - Sarcee ☐ - Beaver ☐ - Sekani ☐ - Kaska (Nahani) ☐ - Tahltan ☐ - Northern Tutchone ☐ - Southern Tutchone ☐
Iroquoian languages - Mohawk ☐ - Cayuga ☐ - Oneida ☐	Salish languages - Shuswap (Secwepemetsin) ☐ - Thompson (Ntlakapamux) ☐ - Halkomelem ☐ - Lillooet ☐ - Okanagan ☐ - Squamish ☐ - Straits ☐
Siouan languages - Dakota ☐ - Stoney ☐	Tsimshian languages - Gitksan ☐ - Nisga'a ☐ - Tsimshian ☐ - ☐

FACEBOOK USAGE AMONG URBAN INDIGENOUS YOUTH AT RISK IN ONTARIO

Wakashan languages - Nootka (Nuu-chah-nulth) ☐ - Haisla ☐ - Heiltsuk ☐ - Kwakiutl (Kwak'wala) ☐			Inuit languages - Inuktitut ☐ - Inuinnaqtun ☐ - Inuvialuktun ☐	
Michif ☐	Haida ☐	Kutenai ☐	Tlingit ☐	English ☐
French ☐	Other (please specify).....			
1.10 Indigenous Title: According to the <i>Indian Act</i> of Canada, you are ...				
First Nations (Including Status and Non-Status First Nations) ☐	Inuit (“Inuit” is the plural form of “Inuk”) ☐	Métis ☐	Other (please specify) 	

FACEBOOK USAGE AMONG URBAN INDIGENOUS YOUTH AT RISK IN ONTARIO

2. Resident

2.1 Were you born in Ottawa?			
Yes ☐ (Then move to the question # 3)	No ☐ , I was born in (please specify) (please specify and move to the question # 2.2)	No comment ☐ (Then move to the question # 3)	
2.2 When did you move to Ottawa?			
Please specify the year			
2.3 Why did you move to Ottawa? (more than one selection allowed)			
Job ☐	School ☐	Health Care ☐	Follow Parents ☐
Other please specify			

FACEBOOK USAGE AMONG URBAN INDIGENOUS YOUTH AT RISK IN ONTARIO

3. How do you connect to your Facebook account(s)?

3.1 You connect to Facebook with the following computer devices ... (more than one selection allowed)				
Desktop computer ☐	Laptop ☐	Tablet ☐	Mobile Phone ☐	Other (please specify)
3.2 How do you connect to the Internet in order to access to your Facebook account(s) (more than one selection allowed)				
Use my home Internet connection ☐	Use Internet at the publicly funded organizations (such as public schools, hospitals, public libraries, etc.) ☐	Use the Internet and data plan on my mobile phone ☐	Other (please specify)	

FACEBOOK USAGE AMONG URBAN INDIGENOUS YOUTH AT RISK IN ONTARIO

4. What social media tool(s) do you currently use? More than one selection allowed.

Facebook ☐	Twitter ☐	YouTube ☐	Google+ ☐	Wikipedia ☐
LinkedIn ☐	Reddit ☐	Pinterest ☐	Instagram ☐	Other (please specify)

5. How often do you use or connect to your Facebook account(s)

Everyday ☐	Once a week ☐	Occasional ☐	Other (please specify)
--------------------------------------	---	--	---------------------------------

FACEBOOK USAGE AMONG URBAN INDIGENOUS YOUTH AT RISK IN ONTARIO

6. What are your objectives to use Facebook? More than one selection allowed.

Connect and maintain relationships with other people ☐	To seek information ☐	Cyber-activism ☐	Preserve and promote your culture ☐	Other (please specify)
---	---	--	--	------------------------------------

7. Do you have any comment or information to share with us relating to your Facebook usage?

Please specify

Appendix D: Indigenous organizations in Ottawa and their Facebook accounts

Indigenous Organizations in Ottawa	Indigenous Organizations' Facebook Account
1. Aboriginal CKCU Type of Organization: Radio Station Website: http://cod.ckcufm.com/programs/28/info.html	Facebook: https://www.facebook.com/CKCUFM
2. Aboriginal Financial Officers of Canada Type of Organization: NGOs Website: www.afoa.ca	Facebook: https://www.facebook.com/aboriginalfinancialofficersassociation
3. Assembly of First Nations Type of Organization: Governance Website: http://www.afn.ca	Facebook: https://www.facebook.com/AFN.APN
4. Congress of Aboriginal Peoples Type of Organization: Governance Website: http://www.abo-peoples.org	Facebook: https://www.facebook.com/Congress-of-Aboriginal-Peoples-178584242154616/?fref=ts
5. First Nations Child and Family Caring Society of Canada Type of Organization: Community Website: https://fncaringsociety.com/	Facebook: https://www.facebook.com/CaringSociety

FACEBOOK USAGE AMONG URBAN INDIGENOUS YOUTH AT RISK IN ONTARIO

6. Grand Council of the Crees Type of Organization: Governance Website: http://www.gcc.ca	Facebook: https://www.facebook.com/gcccra/
7. Inuit Tapariit Kanitami Type of Organization: Governance Website: https://www.itk.ca	Facebook: https://www.facebook.com/inuittapiriitkanatami/
8. Minwaashin Lodge - Aboriginal Women's Support Centre Type of Organization: Community Website: http://www.minlodge.com	Facebook: https://www.facebook.com/sacredchild.minwaashin?fref=ts
9. Métis National Council Type of Organization: Governance Website: http://www.metisnation.ca	Facebook: https://www.facebook.com/M%C3%A9tis-National-Council-186735084697421/
10. National Association of Friendship Centres Type of Organization: Governance Website: http://nafc.ca/en/	Facebook: https://www.facebook.com/TheNAFC
11. Native Women's Association of Canada Type of Organization: Governance Website: http://www.nwac.ca/	Facebook: https://www.facebook.com/NWAC.AFAC/
12. Odawa Native Friendship Centre Type of Organization: Community Website: http://www.odawa.on.ca	Facebook: https://www.facebook.com/Odawa.Friendship

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13. Odawa Neeskak Toastmasters Type of Organization: Governance Website: http://odawaneeskak.toastmastersclubs.org	Facebook: https://www.facebook.com/odawaneeskak/
14. Pauktuutit (Inuit Women of Canada) Type of Organization: Community Website: http://pauktuutit.ca	Facebook: https://www.facebook.com/pauktuutit
15. Wabano Centre for Aboriginal Health Type of Organization: Health Website: http://www.wabano.com	Facebook: https://www.facebook.com/WabanoCentre/?fref=ts

Appendix E: Information sheet and informed consent form for interview participants



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Faculté de génie
Bureau des études supérieures

University of Ottawa
Faculty of Engineering
Graduate Office

Information Sheet and Informed Consent form for Key Informant Participants

Title of the Study: Facebook Usage among Urban Indigenous Youth at Risk in Ontario

Invitation to Participate: I am conducting a study about the use of Facebook by urban indigenous youth in Ontario who are at risk. This study is being conducted as part of my PhD thesis in E-Business at the University of Ottawa.

Purpose of this Study: The aim of this research is to study the Facebook behaviour of urban indigenous youth in Ontario to help identify youth populations who are either physically and/or psychologically at risk.

Participation: Your participation will consist of a 45-minute in-person or telephone interview. You will be asked questions related to your professional experience on how your organization uses Facebook. Your name, position, and organization name will not be revealed. No personally identifiable information will be shown in presentations or publications generated from this research.

Our research consists of the following 3 research questions:

1. Can the data mining of indigenous organizations' Facebook data identify emerging risk factors among urban indigenous youth?
2. How are urban indigenous youth expressing themselves on Facebook when they feel or are at risk?
3. How can the findings from the research questions # 1 and # 2 be adapted to enable Facebook's News Feed algorithm to address the needs of the urban indigenous youth at risk populations?

Risks: There is no risk that is known or associated with your participation in this study. You do not have to answer the questions that you do not want to answer. You can decide to end or withdraw from the interview at any time you wish. Your participation in this study is completely voluntary.

Benefits: Knowledge from this research might enable the Facebook News Feed algorithm to bias their news items and Facebook posts towards helpful news items and positive posts from their Friends' walls. Introducing this bias could help urban indigenous youth at risk to develop a sense of optimism and encourage a greater degree of inclusiveness within their own communities.

Confidentiality: Your participation is strictly confidential. Documents and files will be stored in locked cabinets/password protected computers. I will not share documents with any third party.

☎ 613-562-5347
📠 613-562-5129

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www.uOttawa.ca

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Graduate Office

Conservation of Data: Digital and printed documents in this research, including the audio recording files of this interview, will be destroyed 5 years after the study's completion.

Compensation: There is no compensation for your participation.

Research Ethics Approval: This research has received ethics approval from the Office of Research Ethics and Integrity at the University of Ottawa (File# H02-17-01). They can be reached at 613-562-5387, ethics@uottawa.ca

If you have questions, please do not hesitate to contact me or my doctoral supervisor.

Channarong Intahchomphoo, PhD Candidate,
Dr. André Vellino, Doctoral Supervisor,

Acceptance: You will be asked to provide written consent.

Do you agree to participate in this study? Yes No

Do you permit your interview to be audio recorded? Yes No

Research participant signature

(Please keep a copy for your records.)

Researcher signature Date.....

☎ 613-562-5347
📠 613-562-5129

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Appendix F: Information sheet and informed consent form for survey questionnaire and focus group discussion participants



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Bureau des études supérieures

University of Ottawa
Faculty of Engineering
Graduate Office

Information Sheet and Informed Consent form for Survey Questionnaire and Focus Group Discussion Participants

Title of the Study: Facebook Usage among Urban Indigenous Youth at Risk in Ontario

Invitation to Participate: I am conducting a study about the use of Facebook by urban indigenous youth who are at risk in Ontario. This study is being conducted as part of my PhD thesis in E-Business at the University of Ottawa.

Purpose of this Study: The aim of this research is to study the Facebook behaviour of urban indigenous youth in Ontario to help identify youth populations who are either physically and/or psychologically at risk.

Participation: Your participation will consist of a 15-minute survey questionnaire and one and a half hours of focus group discussion. You will be asked questions related to your personal experience on how you use Facebook in normal life and when feeling at risk. Your name will not be revealed. No personally identifiable information will be showed in presentations or publications generated from this research.

Our research consists of the following 3 research questions:

- Can the data mining of indigenous organizations' Facebook data identify emerging risk factors among urban indigenous youth?
- How are urban indigenous youth expressing themselves on Facebook when they feel or are at risk?
- How can the findings from the research question # 1 and # 2 be adapted to enable Facebook's News Feed algorithm to address the needs of the urban indigenous youth at risk populations?

Risks: There may be some psychological or emotional discomfort and social repercussions (e.g. being negatively judged by other focus group participants) that are known or associated with your participation in this study, especially when you will be asked on how you interact with Facebook when feeling at risk. You do not have to answer the questions that you do not want to answer. You can decide to end or withdraw from the interview at any time you wish. Your participation in this study is completely voluntary. This is a list of indigenous organizations in Ottawa where you can seek help and support for your psychological or emotional discomfort that may occur after participating in this research.

☎ 613-562-5347
📠 613-562-5129

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FACEBOOK USAGE AMONG URBAN INDIGENOUS YOUTH AT RISK IN ONTARIO



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1. Assembly of First Nations	Website: http://www.afn.ca
2. Congress of Aboriginal Peoples	Website: http://www.abo-peoples.org
3. First Nations Child and Family Caring Society of Canada	Website: https://www.cscree.qc.ca
4. Grand Council of the Crees	Website: http://www.gcc.ca
5. Inuit Tapariit Kanitami	Website: https://www.itk.ca
6. Minwaashin Lodge - Aboriginal Women's Support Centre	Website: http://www.minlodge.com
7. Métis National Council	Website: http://www.metisnation.ca
8. National Association of Friendship Centres	Website: http://nafc.ca/en/
9. Native Women's Association of Canada	Website: http://www.nwac.ca/
10. Odawa Native Friendship Centre	Website: http://www.odawa.on.ca
11. Pauktuutit (Inuit Women of Canada)	Website: http://pauktuutit.ca
12. Wabano Centre for Aboriginal Health	Website: http://www.wabano.com

Benefits: Knowledge from this research might enable the Facebook News Feed algorithm to bias their news items and Facebook posts towards helpful news items and positive posts from their Friends' walls. Introducing this bias could help urban indigenous youth at risk to develop a sense of optimism and encourage a greater degree of inclusiveness within your own communities.

Confidentiality: Your participation is strictly confidential. All documents and files will be stored in locked cabinets/ password protected computers. I will not share the documents with any third party. We would also like to ask you to respect the privacy, confidentiality, and identities of other focus group participants. I will not to reveal others' personal information to the public.

Conservation of Data: Digital and printed documents in this research, including the audio recording files of this focus group discussion will be destroyed 5 years after the study's completion.

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613-562-5129

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Compensation: You will be reimbursed \$ 40 CND for your travel expenses for participating in this research.

Research Ethics Approval: This research has received ethics approval from the Office of Research Ethics and Integrity at the University of Ottawa (File# H02-17-01). They can be reached at 613-562-5387, ethics@uottawa.ca

If you have questions, please do not hesitate to contact me or my doctoral supervisor.

Channarong Intahchomphoo, PhD Candidate,
Dr. André Vellino, Doctoral Supervisor,

Acceptance: You will be asked to provide written consent.

Do you agree to participate in this study? Yes No

Do you permit for your interview to be audio recorded? Yes No

Research participant signature

(Please keep a copy for your records.)

Researcher signature Date.....

613-562-5347
613-562-5129

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www.uOttawa.ca

Appendix G: Invitation to participate in research interviews

Title of the Study: Facebook Usage among Urban Indigenous Youth at Risk in Ontario

Dear <indigenous organization>,

My name is Channarong Intahchomphoo, a doctoral candidate in Electronic Business Technologies at the University of Ottawa. I am conducting a research project on “Facebook Usage among Urban Indigenous Youth at Risk in Ontario”. The objective of this research is to study the Facebook behaviour of urban indigenous youth in Ontario in order to help identify youth populations who are either physically and/or psychologically at risk.

I am interested in speaking with social media manager(s) in indigenous organizations in Ottawa to better understand how they use Facebook. Knowledge from this research might enable the Facebook News Feed algorithm to bias their news items and Facebook posts towards helpful news items and positive posts from their Friends’ walls. Introducing this bias could help urban indigenous youth at risk to develop a sense of optimism and encourage a greater degree of inclusiveness within their own communities.

I would like to speak with you in the form of an in-person, or telephone interview which will take around 45 minutes. We can schedule the interview to take place at a time most convenient for you.

This research has received ethics approval from the Office of Research Ethics and Integrity at the University of Ottawa (File# H02-17-01). They can be reached at 613-562-5387, ethics@uottawa.ca

FACEBOOK USAGE AMONG URBAN INDIGENOUS YOUTH AT RISK IN ONTARIO

If you have questions about this study, please do not hesitate to contact me or my doctoral supervisor.

Channarong Intahchomphoo, PhD Candidate,

Dr. André Vellino, Doctoral Supervisor,

Yours Sincerely,

Channarong Intahchomphoo

PhD Candidate in E-Business

University of Ottawa

Appendix H: Invitation to participate in survey questionnaire and focus group discussions

Title of the Study: Facebook Usage among Urban Indigenous Youth at Risk in Ontario

Dear <indigenous organization>,

My name is Channarong Intahchomphoo, a doctoral candidate in E-Business at the University of Ottawa. I am conducting a research project on “Facebook Usage among Urban Indigenous Youth at Risk in Ontario”. The objective of this research is to study the Facebook behaviour of urban indigenous youth in Ontario to help identify youth populations who are either physically and/or psychologically at risk. Knowledge from this research might enable Facebook News Feed algorithm to bias their news items and Facebook posts towards helpful news items and positive posts from their Friends’ walls. Introducing this bias could help urban indigenous youth at risk to develop a sense of optimism and encourage a greater degree of inclusiveness within their own communities.

As part of this project, I will conduct survey and focus group discussions with urban indigenous youth who are using Facebook in their normal lives to gather information about their Facebook experience and personal usage. First, the survey questionnaire will take around 15 minutes for each person to complete. This will be followed by a focus group discussion, which will run approximately one and a half hours. Each focus group will have between 5 and 10 participants.

I am contacting you to pass the information to the potential eligible individuals. To be eligible, an individual must:

FACEBOOK USAGE AMONG URBAN INDIGENOUS YOUTH AT RISK IN ONTARIO

1. Belong to an indigenous group(s) and currently living in Ottawa more than one year;
2. Be between 14 and 35 years old;
3. Currently use Facebook and have their own Facebook account(s); and
4. Be willing to provide consent to participate in this study

Participation in this research is absolutely voluntary. All participants will be reimbursed \$40 CND for their travel expenses for participating in this research. The participation is strictly confidential. For individuals who are interested in participating please ask them to meet at the time and place below:

Group 1:	Group 2:	Group 3:	Group 4:	Group 5:
Date:	Date:	Date:	Date:	Date:
Time:	Time:	Time:	Time:	Time:
Location:	Location:	Location:	Location:	Location:
Group 6:	Group 7:	Group 8:	Group 9:	Group 10:
Date:	Date:	Date:	Date:	Date:
Time:	Time:	Time:	Time:	Time:
Location:	Location:	Location:	Location:	Location:

FACEBOOK USAGE AMONG URBAN INDIGENOUS YOUTH AT RISK IN ONTARIO

This research has received ethics approval from the Office of Research Ethics and Integrity at the University of Ottawa (File# H02-17-01). They can be reached at 613-562-5387, ethics@uottawa.ca

If you have questions about this study, please do not hesitate to contact me or my doctoral supervisor.

Channarong Intahchomphoo, PhD Candidate,

Dr. André Vellino, Doctoral Supervisor,

Yours Sincerely,

Channarong Intahchomphoo

PhD Candidate in E-Business

University of Ottawa

Appendix I: Ethics approval

File Number: H02-17-01

Date (mm/dd/yyyy): 03/23/2017



Université d'Ottawa
Bureau d'éthique et d'intégrité de la recherche

University of Ottawa
Office of Research Ethics and Integrity

Ethics Approval Notice Health Sciences and Science REB

Principal Investigator / Supervisor / Co-investigator(s) / Student(s)

<u>First Name</u>	<u>Last Name</u>	<u>Affiliation</u>	<u>Role</u>
André	Vellino	Arts / Others	Supervisor
Channarong	Intahchomphoo	Engineering / Computer Engineering	Student Researcher

File Number: H02-17-01

Type of Project: PhD Thesis

Title: Facebook Usage among Urban Indigenous Youth at Risk in Ontario

Approval Date (mm/dd/yyyy)	Expiry Date (mm/dd/yyyy)	Approval Type
03/23/2017	03/22/2018	Approval

Special Conditions / Comments:
N/A

FACEBOOK USAGE AMONG URBAN INDIGENOUS YOUTH AT RISK IN ONTARIO

File Number: H02-17-01

Date (mm/dd/yyyy): 03/23/2017



Université d'Ottawa
Bureau d'éthique et d'intégrité de la recherche

University of Ottawa
Office of Research Ethics and Integrity

This is to confirm that the University of Ottawa Research Ethics Board identified above, which operates in accordance with the Tri-Council Policy Statement (2010) and other applicable laws and regulations in Ontario, has examined and approved the ethics application for the above named research project. Ethics approval is valid for the period indicated above and subject to the conditions listed in the section entitled "Special Conditions / Comments".

During the course of the project, the protocol may not be modified without prior written approval from the REB except when necessary to remove participants from immediate endangerment or when the modification(s) pertain to only administrative or logistical components of the project (e.g., change of telephone number). Investigators must also promptly alert the REB of any changes which increase the risk to participant(s), any changes which considerably affect the conduct of the project, all unanticipated and harmful events that occur, and new information that may negatively affect the conduct of the project and safety of the participant(s). Modifications to the project, including consent and recruitment documentation, should be submitted to the Ethics Office for approval using the "Modification to research project" form available at: <https://research.uottawa.ca/ethics/forms>.

Please submit an annual report to the Ethics Office four weeks before the above-referenced expiry date to request a renewal of this ethics approval. To close the file, a final report must be submitted. These documents can be found at: <https://research.uottawa.ca/ethics/forms>.

If you have any questions, please do not hesitate to contact the Ethics Office at extension 5387 or by e-mail at: ethics@uOttawa.ca.

Signature:

Gabriel Petitti
Protocol Officer for Ethics in Research
For Daniel Lagarec, Chair of the Health Sciences and Sciences REB

Appendix J: The Lieutenant Governor's Visionaries Prize presentation script



Channarong Intahchomphoo | Lieutenant Governor's Visionaries Prize | Reconciliation

88 views

0 0 SHARE + ...



The Walrus

Published on Sep 21, 2017

SUBSCRIBE 1.5K

Channarong Intahchomphoo on Facebook Usage Amongst At-Risk Urban Indigenous Youth in Ontario.

I would like to thank the Ojibwe peoples for welcoming me to your traditional territory. My name is Channarong Intahchomphoo. I am originally from Thailand, and I am pursuing a PhD in electronic business technologies at the University of Ottawa. I am studying Facebook usage among at-risk urban Indigenous youth in Ontario. Indigenous youth in Canada have suffered a great deal

in the past and continue to face challenges today. They are more likely to be either physically or psychologically at risk than other population groups in the same age range. However, help for vulnerable Indigenous youth frequently arrives too late. It normally takes some time for family, friends, community members, and government agencies to identify Indigenous youth in danger. It also usually takes some time for people voluntarily seeking help to inform their family members and friends about their situations.

My research studies the Facebook behaviour of urban Indigenous youth in Ontario and aims to help reveal the complex truths of their lives. I am hoping that the results of this research could be used to improve the lives of Indigenous youth by enabling Facebook's News Feed algorithm to provide helpful news items and suggest positive posts from their friends' walls. This approach could help urban Indigenous youth develop a greater sense of optimism and foster a higher degree of inclusiveness within their communities. I moved to Canada as a permanent resident in early 2006 after finishing my undergraduate education at Chiang Mai University in Thailand. After starting my life in Canada in New Brunswick, I moved to Ottawa in 2010 to pursue graduate studies at the University of Ottawa, which is where I am now. As a foreigner living in a new country, I wanted to learn about Canada's history in order to truly understand the peoples and the lands. I was shocked when I learned about the tragic suffering that Indigenous peoples have experienced. I decided that I would try to do what I do best—research and manage information—to make a contribution.

This research project was born from my belief that it is possible to make real changes in the lives of Indigenous youth through social media. I have also been influenced by a quote from *The Reason You Walk*, a memoir by Wab Kinew: "*We ought to recognize that our greatest battle is not with*

one another but with our pain, our problems, and our flaws. To be hurt, yet forgive. To do wrong, but forgive yourself. To depart from this world leaving only love. This is the reason you walk.”

The information we are exposed to can have a toxic effect on our minds. We can use the power of social media to help understand Indigenous youth and also to encourage them to continue moving forward. Life is full of wonders as well as suffering. We need to redress the causes of injustice, improve living conditions, provide equal treatment, and make education accessible. And we also all need to be reminded of the good things in life and be surrounded by information alternatives to hopelessness and despair. I want to thank two people who helped make my research project happen: my friend Mr. Danny Vollant, Innu Indigenous scholar and candidate in Licentiate in Law (LLL) at the University of Ottawa, and my doctoral supervisor Dr. André Vellino at the School of Information Studies, University of Ottawa. Finally, I want to send my good thoughts and prayers to all Indigenous youth and their families in Thunder Bay.

**Appendix K: The research paper conducted at the TIK Centre for
Technology, Innovation and Culture, University of Oslo, Norway**

Social media and youth suicide: A systematic review

Channarong Intahchomphoo

This article published in the proceeding of 2018 European Conference on Information Systems:

Beyond Digitization-Facets of Socio-Technical Change, Portsmouth, UK,

23-28 June 2018.

(This paper is written based on the conference submission guidelines.)

Abstract

This paper examines peer-reviewed publications studying the links between social media and youth suicide. For this systematic review, papers were collected from three academic databases: Scopus, Web of Science, and PsycINFO. From among the 495 papers reviewed, 82 were included in the initial review. In addition, a second search of the ScienceDirect database yielded 15 studies. From these 97 papers, the findings indicate that there are two major links between social media and youth suicide: (1) the positive link is mainly about youth suicide prevention including detecting youth at risk of suicide with their social media posts, running youth suicide prevention awareness campaigns, and offering consultations to youth with suicide ideation via social media; and (2) the negative link focuses on how social media is used as a tool to encourage and pressure youth towards suicide including cyberbullying, sexting, and disseminating information about self-harm techniques or pro-suicide content on social media. This research demonstrates that social media has both positive and negative links to youth suicide. We make suggestions for future information systems research.

Keywords: Social media, youth suicide, systematic review

1. Introduction

The past decade has seen a significant increase in the use of social media platforms such as Facebook, Twitter, and YouTube, coinciding with the global adoption of such media as a form of entertainment and social interaction. Social media platforms have increasingly been integrated into many aspects of peoples' daily activities, as a result of the ubiquity of applications on mobile devices (Mihailidis, 2014). People have also turned to social media to disseminate information about their mental health (McClellan, Ali, Mutter, Kroutil, and Landwehr, 2017). However, many personal wellbeing posts contain disturbing suicidal messages, particularly the ones being generated and shared by youth.

UNESCO (2016) defines youth as the population group ranging from 15 to 35 years of age. Youth, according to that definition, are the most at risk age group of committing suicide in populations across societies and cultures (World Health Organization, 2017). Transitioning through this stage of life requires young people to cope with changes in hormones, physical state, mood, and social behaviour in their exploration of identity and quest for autonomy. Some groups of young people face higher risks of suicide if they have to deal with all of those transitional challenges as well as dealing with other challenges such as a broken family, the break-up of an intimate relationship, poverty, sexual abuse, and other vulnerabilities. This review addresses suicide as well as suicide attempts.

I focus on the social media and youth suicide combination because of the high and increasing worldwide usages of social media. Adolescent suicide is also a worldwide challenge that many countries and cultures are currently facing. In our recent research conducted with urban indigenous

youth in Ontario, Canada, we found that Facebook was used as a tool by some indigenous teenagers to live stream their suicide attempts (Intahchomphoo, Vellino, and Gundersen, under review).

There is currently no systematic review of the information systems academic literature to find links between social media and youth suicide. In recent years, researchers have conducted general and systematic literature reviews on text mining applications in psychiatry (Abbe, Grouin, Zweigenbaum, and Falissard, 2016), using technology to deliver mental health service to children and youth (Boydell et al., 2014), social media and public health practice (Capurro, et al., 2014), social media usage to discuss and view self-harm acts (Dyson et al., 2016), ethno-cultural aspects of suicide in young people (Colucci and Martin, 2007), media roles in suicide prevention (Sisask and Värnik, 2012), prevalence and effect of cyberbullying on children and youth (Hamm et al., 2015), social media use among patients and caregivers (Hamm et al., 2013), social media and youth violence (Patton et al., 2014), suicide prevention via the internet (Jacob, N., Scourfield, J., and Evans, R., 2014), social media and suicide prevention (Robinson et al., 2016), and suicide prevention strategies (Zalsman et al., 2016). Thus, it is important to develop an understanding in this specific area of social media and youth suicide and address a research gap.

2. Methods

The purpose of the review is to determine the current state of knowledge in the academically indexed literature on the roles that social media plays in the youth suicide. We chose the systematic literature review method because it is transparent, reproducible and limits personal bias. This literature review method has its origins in the Cochrane systematic review method in the medical field (Cochrane Training, 2017). This method was designed for evaluating and interpreting literature on evidence-based human health care and has since been applied to other disciplines.

Each of the main steps in such a review has to be clearly identified and explained. The method requires that specific literature review question(s) be formulated at an early stage of the process (Kitchenham, 2007). The review question provides the criteria for the scope of literature content and determines how the included studies will be examined, coded, and reported. This systematic review was conducted in the summer and fall of 2017 and revised with feedback from reviewers in the spring 2018. We formulated the following review question: “What are the links between social media and youth suicide?”

2.1 Data sources and search strings

For this systematic review, we collected papers from three academic databases: Scopus, Web of Science, and PsycINFO. We performed full-text searches in these databases on the same day using the same search strings.⁵ We conducted the search as a full-text search rather than limiting it to metadata fields such as the title, keywords and abstract. Searching for the full-text has the advantage that any document containing the search terms will be retrieved, thus not missing a potentially relevant study; i.e. it maximizes recall. The disadvantage is a loss in precision: some documents may be retrieved that contain the keywords but occur in the full-text incidentally and are not directly relevant to the research question (Manning, Raghavan, and Schütze, 2008). The increased recall thus required a human filtering process to eliminate irrelevant papers in which search terms were merely mentioned.

The search expression was designed around two main concepts: “social media” and “youth suicide”. The first concept, “social media”, is also referred to as “social networking” and includes

⁵ (“social media” OR “social networking” OR Facebook OR Twitter OR YouTube) AND (“youth suicide” OR “teen suicide” OR “teenage suicide” OR “adolescent suicide”), performed on August 22, 2017

popular tools such as Facebook, Twitter, and YouTube. Even though the terms “social networking” and “social media” are often used interchangeably, especially in non-academic contexts, each has its own distinct definition. Social media refers to Web 2.0 functionalities relating to user generated content (Obar and Wildman, 2015), and social networking is about how people use social media tools to communicate and engage with other users to build online communities (Subrahmanyam, Reich, Waechter, and Espinoza, 2008). There are various types of social media including social networks, micro-blogging, online forums, online bookmarking, wikis, social news, and media sharing (Farzindar and Inkpen, 2015). The second concept, “youth suicide” is also referred to as “teen suicide”, “teenage suicide”, and “adolescent suicide”.

2.2 Selection criteria

The criteria for selecting the primary studies to be included in the sample that were subsequently analysed included:

Type of publication: The studies must have been published in peer-reviewed journals. The content also had to be available in full-text. The criteria of peer-review offers some level of quality control, as does the fact that they are indexed in Scopus, Web of Science, PsycINFO, and ScienceDirect. The availability of publications in full-text guarantees that the indexing and retrieval process covers all the terms in the articles, not just in the metadata fields.

Date of publication: The studies must have been published between January 2004 and December 2016. The date of publication constraint is based on the fact that Twitter started in 2006, YouTube in 2005, and Facebook in 2004. Twitter and Facebook are of particular importance as they are the most widely used international social media tools. The year 2016 is the last completed year before this review began.

Relevance to the review question: The studies must be relevant to the review question. Queries in a search engine only retrieve documents that contain the search terms and the presence of a term or even a combination of terms is not a sufficient condition for the relevance of the study to the research question. It could be that the terms occurred, for example, only in the bibliography of a study and not in the study itself.

Relevance assessment: This is completed by reading the article. Papers included could cover all possible studies related to social media and youth suicide, including those on how social media features have caused youth suicide and papers investigating social media usage among youth preceding suicide.

Language: The studies must have been written in English.

Subject: Studies could come from any academic discipline so there is no constraint in this area. The absence of disciplinary constraints ensured that the search expression would retrieve as many relevant articles as possible (maximum recall). Furthermore, academic discipline need not be restricted as research on this question spans multiple disciplines.

Duplicates: If the searches on Scopus, Web of Science, PsycINFO, and ScienceDirect produced duplicate results only one occurrence of the document would be counted.

2.3 Included and excluded studies

This is a summary of the search results and the number of studies that met the review criteria. We found 495 papers matching the search criteria. We reviewed the studies with 419 results matching the search string in Scopus being reduced to 202. It was because there were 217 results in the irrelevant type of publication, written in the wrong language or time period. In Web of Science,

10 results matching the search string were reduced to 1. This was because there were 8 duplicated studies that were already found in the SCOPUS search results in this review. 66 results matching the search string in PsycINFO were reduced to 65. This was due to 1 study being duplicated within the PsycINFO research results.

After completing a review of all the retrieved studies, there are 82 studies addressing our review question. The publication years of the included studies shown in the timeline (Figure 1) indicates that there was a gradual increase in the number of studies relating to the social media and youth suicide between 2008 and 2015 with a spike in publications in 2016. Relevance to the review question was determined by reading the article. Examples of categories of irrelevant articles from the 186 studies that were eliminated include: traditional media and suicide coverage; physician education on adolescent suicide prevention; youth suicide and family environment; suicide attempts among children; youth suicide and barriers to access to mental health treatment; suicide association with video game and Internet overuse; adolescent smoking; adolescent alcohol abuse; follow-up study after youth suicide attempt; adolescent sleep efficiency; Facebook and stress management among medical students; the role of culture in youth suicide prevention; youth suicide effects of parents, peers, and school; how to cope with youth suicide incidents; and the impact of parental suicide on child and youth.

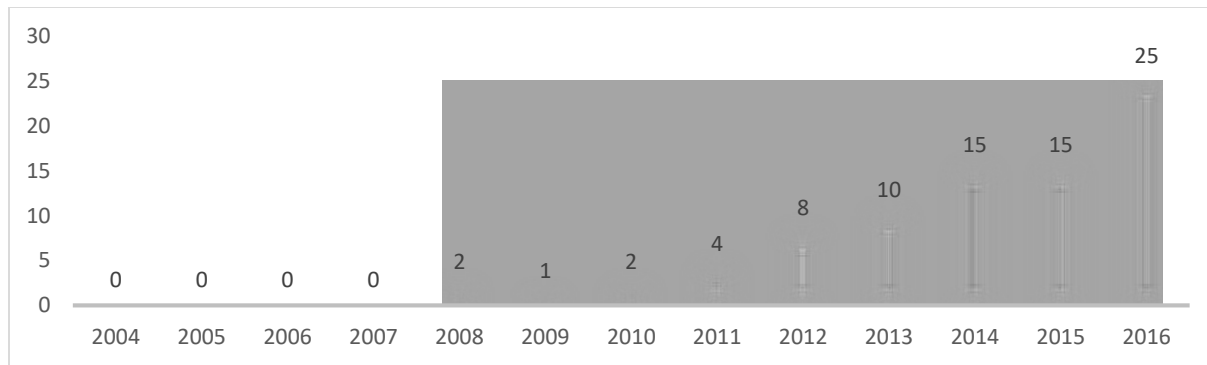


Figure 1: Publication Years Timeline of Studies Answering to Our Review Question

Supplementary Search

Following reviewer feedback, we conducted a second search in the ScienceDirect database on April 3, 2018 using the same search strings and selection criteria, this new search yielded 15 studies that provide corroborating evidence to support the findings in the 82 main studies from the first search. Many studies retrieved from the second search were mostly from the psychology discipline and they did contain the keyword of social network. However, those studies referred and discussed the social network as a face-to-face human relationship concept occurring mainly among friends and family. They were not about social media tools like Facebook or Twitter at all. Therefore, those retrieved studies did not qualify to be selected for this review.

3. Results

I read all the articles and listed all the themes and then clustered them together according to thematic similarity. The method for identifying themes was driven by a top down thematic analysis. The findings indicate that there are two major links between social media and youth suicide: (1) the positive link, which is mainly about youth suicide prevention; and (2) the negative

link, which focuses on how social media is used as a tool to encourage and pressure youth toward suicide.

3.1 Positive link

The positive links between social media and youth suicide include: (1) detecting youth at risk of suicide with their social media posts; (2) running youth suicide prevention awareness campaigns on social media; and (3) offering online consultations to youth with suicidal ideation via social media. These three categories are based on patterns identified through thematic analysis.

In our sample, 18 papers identified detecting youth at risk of suicide through their social media posts. Social media gives an opportunity to quickly detect teenage suicidal tendencies in real time and it can be done on a large scale (Robert, Suelves, Armayones, and Ashley, 2015). Youth nowadays often express suicidal thoughts on social media even before talking face-to-face to friends, family members, or healthcare professionals about their mental health issues. They are always connected through the Internet and social media. Social media has become a powerful monitoring tool for suicide among youth especially when data mining technology, artificial intelligence, and machine learning algorithms are applied (Goh, and Huang, 2009; Bushman et al., 2016; Nguyen, Phung, Dao, Venkatesh, and Berk, 2014).

Chen, Chai, Zhang, and Wang (2014) presented their development of a data mining system to understand teen suicide trends in China using data from Chinese webpages and blogs. Their system was programmed to produce a set of indicators to report suicide events. Similar studies (Li, Chau, Yip, and Wong, 2014; Cheng, Kwok, Zhu, Guan, and Yip, 2015) look at the language patterns and blog posting frequency to predict signs of suicidal processes among Chinese youth. Furthermore, other researchers created a suicide dictionary to detect, in real-time, suicide risks among Chinese-

speaking youth on Weibo, China's largest micro-blogging site. These dictionary-based identifications are expected to be very useful for the development of suicide monitoring applications (Lv, Li, Liu, and Zhu, 2015). Another data mining research paper in our sample (Song, Song, Seo, and Jin, 2016) was conducted with social media posts of Korean adolescents. They found suicide-related words such as depression, victims of bullying, concern about illness, and financial hardship in the dataset.

Twitter was frequently discussed in our sample. Twitter was tested to be an effective surveillance tool for tracking the risk factors of youth suicide by identifying and analysing keywords and phrases from young peoples' tweets (Jashinsky et al., 2014). Youth in Japan also post their suicide ideation on Twitter. Their Twitter logs could be used to identify youth in danger of self-injury (Sueki, 2015). Facebook was also frequently mentioned in our sample. Facebook was found to be extremely helpful for youth with suicidal thoughts to be able to recognize their own mental health conditions. It helps them to agree to receive psychiatric and medical treatment. (Ahuja, Biesaga, Sudak, Draper, and Womble, 2014; Moreno et al., 2011; Moreno et al., 2012). In 2011, Facebook launched a tool for people to report suicidal content. Users can report if they see their Facebook friends have posted suicidal messages. This Facebook feature was designed to identify people with self-harm potential. Facebook will link the person with suicide prevention hotlines (Bell, 2014). In our sample, there are some Facebook studies focusing on university students. College students could notice and recognize the suicidal content of their peers' posts on Facebook. They intervened by calling or having a face-to-face conversation with friends who posted suicidal content on social media (Corbitt-Hall, Gauthier, Davis, and Witte, 2016; Egan, Koff, and Moreno, 2013) or report to the school staff (Michael et al., 2015). In this situation, Facebook is utilized for helping youth to combat with stigma associated with mental health issues. Usually, suicidal thoughts are kept

private. Social media has completely changed how youth communicate to other people about their suicide attempts (Moreno et al., 2011).

In our sample, 20 papers identified running youth suicide prevention awareness campaigns on social media. Positive usages of social media could help to prevent youth suicide. Social media can facilitate peer support to youth with suicidal thoughts, and promote suicide prevention programs and awareness to reach a wider audience (Luxton, June, and Fairall, 2012; Sleet et al., 2012). Research by Jordan et al. (2012) shows that young men with suicidal ideation felt there should be more proactive outreach and campaigns on social media to encourage youth to access mental health care because social media is very heavily used among youth. Wyman (2014) further suggested researchers and communities should use social media to determine which adolescent suicide interventions effectively reach at-risk youth the most.

Several research papers in our sample focus on suicide prevention awareness campaigns specifically for lesbian, gay, bisexual, transgendered, and queer (LGBTQ) youth. Since LGBTQ youth worldwide experience and suffer from homophobic abuses and distress related to their gender identity, they face higher rates of suicide. Social media helps to reach LGBTG youth at risk. Historically, this population has been quite difficult to reach (Silenzio et al., 2009). A study by McDermott, Roen, and Piela (2013) shows that online discussion forums become a place where many LGBTQ youth discuss their suicide attempts. The emotional data posted on the online forums could help to develop suicide prevention strategies and campaigns. For example, the “*It Gets Better*” project, a very successful LGBTQ youth suicide prevention campaign on YouTube, aims to create strong online communities to give hope and virtually engage with LGBTQ youth worldwide by informing them that their difficult situations will improve (Muller, 2012; Goltz,

2013). The campaign started in 2010 on YouTube and later extended to other social media platforms including Facebook, Google+, Instagram, Tumblr, and Twitter (Honda, 2016). The campaign encourages activists, politicians, celebrities, and people in general to make anti-bullying videos and post them on YouTube to show their support and offer hope to LGBTQ youth (Grzanka, and Mann, 2014). Many activists who self-identify as straight also got involved in the *"It Gets Better"* campaign because they recognize how serious the LGBTQ youth suicide crisis is worldwide (Grzanka, Adler, and Blazer, 2015).

Another way of promoting youth suicide prevention awareness campaigns on social media is through online obituary or mourning pages. Parents, siblings, children, partners, and family friends posted on social media giving their memorial feelings and grief related to their deceased youth who died by suicide. Online obituaries on social media also help other young people who are seeking peer support after losing their friends to suicide (Krysinska, and Andriessen, 2015; Ferreday, 2010). A study by Hacker, Collins, Gross-Young, Almeida, and Burke, (2008) states that between the years 2000 and 2005, the city of Somerville of Massachusetts experienced a wave of suicides spreading among the local youth. Many of them were coping with substance abuse and overdoses as well. Various friends of the youth suicide victims posted obituary videos on YouTube to pay their respects to and express memories of those lost. The YouTube videos helped the city to determine the youth suicide contagion and identify individuals at risk. Other research by Cox et al. (2016) recommends that schools post memorial pages on social media when their students have committed suicide and one necessarily passes away when committing suicide. This is a way to raise awareness about the youth suicide crisis and to monitor for and identify individual at risk.

Moreover, some youth suicide prevention awareness campaigns on social media in our sample are being researched in school and university settings. High schools in Australia run suicide prevention campaigns to promote help-seeking intentions for youth with suicide ideas. A group of student leaders was asked to create positive messages on their Facebook pages and share them with other students. Their Facebook messages are about how the adult support staff at schools can be trusted for mental health advice. The campaign aims to prevent and act as a means of early intervention for youth suicide (Calear et al., 2016). In a similar study (Camelford, and Ebrahim, 2016), high school students were asked to watch YouTube videos about cyberbullying experiences and then participate in role-playing based on the cyberbullying situations. This educational activity aims to increase empathy from students toward cyberbullying victims and reduce cyberbullying intentions. Other schools also used YouTube similarly for their bullying prevention and awareness campaigns. They showed video clips of the actual students who were the victim of bullying sharing their horrible experiences. These YouTube videos help teachers and students to start group discussions in the classroom about bullying-related topics (Ziomek-Daigle and Land, 2016; Doane, Kelley, and Pearson, 2016). At the university level, social media has become a main channel to disseminate and inform students about suicide prevention programs available at their universities (Manning, and Van Deusen, 2011).

In our sample, 11 papers identified offering online consultations on social media to youth attempting suicide. The utilization and awareness of youth crisis hotlines remain low. Many youth at risk of suicide prefer to seek help and information on the Internet including social media (Crosby Budinger, Cwik, and Riddle, 2015; Best, Manktelow, and Taylor, 2016). Online suicide discussion forums have been shown to be somewhat beneficial for youth with suicidal thinking. The anonymous discussion of suicide helps youth who are forum readers or members to gain more

support and they do not have to disclose their identity. On the discussion forums, youth who have overcome their mental health challenges share their experiences to inspire other youth. Importantly, the information on the forums can be accessed and is available anytime through the Internet (Wiggins, McQuade, and Rasmussen, 2016; Robert, Suelves, Armayones, and Ashley, 2015; Frost, Casey, and Rando, 2016). It is recommended that clinicians and therapists use online forums to establish a professional relationship with mental health patients (Scherr, and Reinemann, 2016). Social media-based mental health interventions could be done in various forms such as giving closed group online consulting as well. A study by Carson, Farrelly, Frazer, and Borthwick (2015) provides a good example of indigenous communities in Australia. These communities use Facebook to offer help to youth at risk of committing suicide by giving emotional support and guidance on how to access the available mental health services. As described above, social media helps to construct a sense of belonging, peer support, and positive relationships during social isolation among youth at risk of suicide (Rice et al., 2016; Tseng, and Yang, 2015). Gay youth at risk for suicide also felt social media allowed them to be a part of online communities while they were seeking encouragement and support (Davis, Stafford, and Pullig, 2014). Brooks and Longstreet (2015) point out that youth with depression also felt they lose track of time when using social media. They do not have to think about their psychological problems.

3.2 Negative link

Negative links between social media and youth suicide were also found. It relates to how social media is used to encourage and pressure youth toward suicide including cyberbullying, sexting, and disseminating information about self-harm techniques and pro-suicide content on social media.

In our sample, 27 papers identified cyberbullying through social media as the cause of several youth suicides. It involves sending or posting harmful and hurtful messages, pictures, and videos by one person or group of people, targeting the adolescent victims (Alvarez, 2012; Bhat, 2008; Chapin, 2016; Crosslin, and Golman, 2014; Doane, Boothe, Pearson, and Kelley, 2016; Eden, Heiman, and Olenik-Shemesh, 2013; Jane, 2015; King, 2010; Messias, Kindrick, & Castro, 2014; Rafiq et al., 2016; Sampasa-Kanyinga and Hamilton, 2015; Stoll, and Block, 2015; Luxton, June, and Fairall, 2012; Arango, Opperman, Gipson, and King, 2016; Hemphill et al., 2012). Personality disorders and jealousy about those in close relationships are found to be factors associated with cyberbullying among young people (Stockdale, Coyne, Nelson, and Erickson, 2015). Furthermore, a metadata and content analysis of videos on Vine, a video-based social network, detected a number of videos that exhibited cyberbullying threats to young people (Rafiq et al., 2016). Messias, Kindrick, & Castro (2014) and Rice et al. (2015) report that female youth are more often both perpetrators and victims of cyberbullying more than their male counterparts. One such example occurred in Canada, resulting in the suicide of Amanda Todd, a Canadian youth who was blackmailed to show her breasts on a live webcam to an unknown person. Her body screenshots were later shared on social media. Many of her classmates then saw the photos. Before killing herself, Miss Todd posted a video on YouTube explaining her blackmail experience. She referred it as a cyberbullying action (Penney, 2016).

In the United States, LGBTQ students often reported that they were the victims of cyberbullying (Rice et al., 2015). An instance of LGBTQ cyberbullying leading to suicide was that of Tyler Clementi, who jumped from the George Washington Bridge in 2010 after his roommate used a webcam to record Clementi kissing another man and then tweeted about it on Twitter. The incident brought national attention to the issue of cyberbullying on social media towards gay teens (Gilden,

2013; Corbo and Zweifel, 2013; Davis, Stafford, and Pullig, 2014). In many cases, cyberbullying was found to be linked to the victims' race, gender, and sexual orientation (Stoll, and Block, 2015). Often, the perpetrators of cyberbullying remain anonymous (Bharwaney, and Marwah, 2013) and not many young people inform their parents, guardians, or teachers about the cyberbullying they have encountered. Often, they do not seek help. They try to cope with cyberbullying by themselves (Chapin, 2016; Crosslin, and Golman, 2014; King, 2010). Youth protect themselves from cyberbullying on Facebook by deleting or blocking abusive social media users. Furthermore, some of them decided to quit using Facebook (Chapin, 2014). Teachers are very concerned about their students being cyberbullied on social media. Every school should have coping strategies for cyberbullying in place for their students and parents (Eden, Heiman, and Olenik-Shemesh, 2013). Cyberbullying among college students increases the likelihood that they will drop out of college and skip classes. Their learning is negatively impacted as the victims of cyberbullying are fearful and feel they are being targeted both online and offline (Gibb, and Devereux, 2014). In the United States, the federal government had to enforce new legislation for schools to patrol and prevent their students from being cyberbullied on social media. There is a new duty to protect students and prevent any further youth suicides related to cyberbullying. Legislators, parents, and schools have to collectively work together to combat cyberbullying (Fenn, 2013; King, 2010; Marlin-Bennett and Thornton, 2012). Social media platforms such as Yelp, Facebook, and YouTube address the anti-cyberbullying by including policies in their corporate values and terms of services to prohibit their platform usage for any hate speech, which may contribute to teenage suicide (DeNardis and Hackl, 2015).

In our sample, 7 papers identified sexting on social media – the sending and receiving of texts with sexual or nude images, or short videos – as a contributing factor to youth suicide. Sexting among youth – both receiving and sending –increases the risk of suicide, since it is associated with shame, humiliation, depression, and harassment that affect the person whose images were taken and distributed (Ahern, and Mechling, 2013; Bailey, and Hanna, 2011). Sexting is found to be the most common method of harassment among youth who just ended violent dating relationships (Alvarez, 2012; Strassberg, Rullo, and Mackaronis, 2014). Girls are more often the victims of sexting than boys. After the breakup of romantic relationships, some youth use social media such as Facebook to track their ex-partners' new partnerships and other personal activities. Feelings of jealousy arising from the possibility of cheating, and overprotectiveness on social media also initiate the first stage of abusive relationships, breakups, and suicidal ideation among many teens (Baker, Helm, Bifulco, and Chung-Do, 2015). These monitoring behaviours on social media also increase the risk of young people taking their own lives (Lee, and O'Sullivan, 2014). Youth sexting via social media is the distribution of images without the victim's consent and authorization. From a legal standpoint, both redistributors and viewers involved in such non-consensual youth sexting can be prosecuted for child pornography offences (Bailey, and Hanna, 2011; Strassberg, McKinnon, Sustaíta, and Rullo, 2013).

Within our sample, 24 papers identified disseminating information about self-harm techniques and pro-suicide content on social media as contributing factors to suicidal ideation. Youth who are exposed to suicide-encouraging content on social media are more likely to think about killing themselves. YouTube self-harm videos are visually graphic while content on Facebook and MySpace was found to be more of group discussions related to suicide attempts (Mitchell, Wells, Priebe, and Ybarra, 2014). A study by Luxton, June, and Fairall (2012) indicates that self-harm

videos are not difficult to find on YouTube. Some youth broadcast their suicidal thoughts and intentions on social media (Cash, Thelwall, Peck, Ferrell, and Bridge, 2013; Herbst, Stanley, and Byard, 2014; Karbeyaz, Toygar, and Çelikel, 2016; Klein, 2012; Ma, Zhang, Harris, Chen, and Xu, 2016). It is difficult to know what type of information youth with suicidal intentions will find on social media (Tseng and Yang, 2015). This is a real threat for organizations working to provide crisis assistance and suicide interventions to youth via social media (Robert, Suelves, Armayones, and Ashley, 2015). In addition, online discussion forums are sometimes found on online communities on the dark web with youth who try to encourage others to commit suicide as groups or in suicide pacts. Youth also exchange information concerning suicide methods on some of these forums and they even try to recruit people to join their online discussion forums. This is very dangerous for youth who are already in vulnerable situations (Bell, 2014; Dunlop, More, and Romer, 2011; Klein, 2012; Luxton, June, and Fairall, 2012; Robert, Suelves, Armayones, and Ashley, 2015; Scherr, and Reinemann, 2016; Kõlves and Leo, 2016). Between 2007 and 2014, researchers found there was a dramatic increase in the number of blogs and discussion forums that provide information about methods of suicide (Biddle et al., 2016).

A study by Oksanen et al. (2016) shows that American, British, German, and Finnish youth are often exposed to suicide content on social media. It was found that exposure to physically and psychologically harmful content leads to a higher risk of suicidal thoughts among the youth. A similar study suggests that among runaway and homeless youth, when interacting on social media with other runaway and homeless youth who are coping with thoughts of suicide, their own risk of suicide also increases (Fulginiti, Rice, Hsu, Rhoades, and Winetrobe, 2016). When social media becomes a source of suicide information, youth will be likely to have the misperception of peer suicide behaviour. Social media is contributing to suicide contagion among some youth

(Robertson, Skegg, Poore, Williams, and Taylor, 2012; Sawyer et al., 2012; Zimmerman, Rees, Posick, and Zimmerman, 2016; Colombo, Burnap, Hodorog, and Scourfield, 2016, Varghese and Gray, 2011).

In another scenario, youth with suicidal ideation use social media to seek to build relationships with people online in order to combat their own social isolation. It does not help when they learn that other people's lives are much happier than theirs. Such a perception actually leads higher risks of suicide for them (Singleton, Abeles, and Smith, 2016). Brooks, and Longstreet (2015) conclude that when young people spend more time on Facebook, they become more exposed to emotional messages. These messages could lead to the accumulation of bad feelings and the increase in levels of depression and suicide. Related research by Phillips (2014) remarks that social media enhances the way people communicate and connect, but it still does not decrease loneliness for some people. Social isolation and misleading information are not good for youth, particularly those coping with mental and psychiatric disorders.

4. Discussion and Suggestions for Information Systems Future Research

The table below shows the categorization of the papers included in the systematic literature review grouped by subject. To perform the relevance assessment each study is rated as pointing out the positive or negative aspects of the subject discussed. If the study entirely covered the aspects of the subject the score equals to 2, and if it partially covers it then it equals to 1.

FACEBOOK USAGE AMONG URBAN INDIGENOUS YOUTH AT RISK IN ONTARIO

<i>Author, Year</i>	<i>Relevance Score</i>
Detecting youth at risk of suicide	
Robert, Suelves, Armayones, and Ashley, 2015	2
Goh, and Huang, 2009	2
Bushman et al., 2016	1
Nguyen, Phung, Dao, Venkatesh, and Berk, 2014	2
Chen, Chai, Zhang, and Wang, 2014	2
Li, Chau, Yip, and Wong, 2014	2
Cheng, Kwok, Zhu, Guan, and Yip, 2015	2
Lv, Li, Liu, and Zhu, 2015	2
Song, Song, Seo, and Jin, 2016	2
Jashinsky et al., 2014	2
Sueki, 2015	2
Ahuja, Biesaga, Sudak, Draper, and Womble, 2014	2
Moreno et al., 2011	2
Moreno et al., 2012	2
Bell, 2014	2
Corbitt-Hall, Gauthier, Davis, and Witte, 2016	2
Egan, Koff, and Moreno, 2013	2
Michael et al., 2015	1
Running youth suicide prevention awareness campaigns	
Luxton, June, and Fairall, 2012	2

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Sleet et al., 2012	2
Jordan et al., 2012	1
Wyman, 2014	2
Silenzio et al., 2009	2
McDermott, Roen, and Piela, 2013	1
Muller, 2012	2
Goltz, 2013	2
Honda, 2016	2
Grzanka, and Mann, 2014	2
Grzanka, Adler, and Blazer, 2015	2
Krysinska, and Andriessen, 2015	2
Ferreday, 2010	2
Hacker, Collins, Gross-Young, Almeida, and Burke, 2008	2
Cox et al., 2016	2
Calear et al., 2016	2
Camelford, and Ebrahim, 2016	2
Ziomek-Daigle and Land, 2016	2
Doane, Kelley, and Pearson, 2016	2
Manning, and Van Deusen, 2011	2
Offering online consultations	
Crosby Budinger, Cwik, and Riddle, 2015	2
Best, Manktelow, and Taylor, 2016	2

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Wiggins, McQuade, and Rasmussen, 2016	2
Robert, Suelves, Armayones, and Ashley, 2015	2
Frost, Casey, and Rando, 2016	2
Scherr, and Reinemann, 2016	2
Carson, Farrelly, Frazer, and Borthwick, 2015	2
Rice et al., 2016	2
Tseng, and Yang, 2015	2
Davis, Stafford, and Pullig, 2014	2
Brooks and Longstreet, 2015	2
Cyberbullying	
Alvarez, 2012	2
Bhat, 2008	1
Chapin, 2016	2
Crosslin, and Golman, 2014	2
Doane, Boothe, Pearson, and Kelley, 2016	2
Eden, Heiman, and Olenik-Shemesh, 2013	1
Jane, 2015	1
King, 2010	2
Messias, Kindrick, & Castro, 2014	2
Rafiq et al., 2016	2
Sampasa-Kanyinga and Hamilton, 2015	2
Stoll, and Block, 2015	2

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Luxton, June, and Fairall, 2012	2
Arango, Opperman, Gipson, and King, 2016	2
Hemphill et al., 2012	2
Stockdale, Coyne, Nelson, and Erickson, 2015	2
Rice et al., 2015	2
Penney, 2016	2
Gilden, 2013	1
Corbo and Zweifel, 2013	2
Davis, Stafford, and Pullig, 2014	2
Bharwaney, and Marwah, 2013	1
Chapin, 2014	2
Gibb, and Devereux, 2014	2
Fenn, 2013	1
Marlin-Bennett and Thornton, 2012	1
DeNardis and Hackl, 2015	1
Sexting	
Ahern, and Mechling, 2013	2
Bailey, and Hanna, 2011	2
Alvarez, 2012	2
Strassberg, Rullo, and Mackaronis, 2014	2
Baker, Helm, Bifulco, and Chung-Do, 2015	1
Lee, and O'Sullivan, 2014	2

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Strassberg, McKinnon, Sustaíta, and Rullo, 2013	2
Disseminating information about self-harm techniques and pro-suicide content	
Mitchell, Wells, Priebe, and Ybarra, 2014	2
Luxton, June, and Fairall, 2012	2
Cash, Thelwall, Peck, Ferrell, and Bridge, 2013	2
Herbst, Stanley, and Byard, 2014	1
Karbeyaz, Toygar, and Çelikel, 2016	1
Klein, 2012	2
Ma, Zhang, Harris, Chen, and Xu, 2016	2
Tseng and Yang, 2015	2
Robert, Suelves, Armayones, and Ashley, 2015	2
Bell, 2014	2
Dunlop, More, and Romer, 2011	2
Scherr, and Reinemann, 2016	2
Kölves and Leo, 2016	2
Biddle et al., 2016	2
Oksanen et al., 2016	2
Fulginiti, Rice, Hsu, Rhoades, and Winetrobe, 2016	2
Robertson, Skegg, Poore, Williams, and Taylor, 2012	2
Sawyer et al., 2012	1
Zimmerman, Rees, Posick, and Zimmerman, 2016	2
Colombo, Burnap, Hodorog, and Scourfield, 2016	2

Varghese and Gray, 2011	1
Singleton, Abeles, and Smith, 2016	2
Brooks, and Longstreet, 2015	2
Phillips, 2014	1

Table 1: Categorization of the Papers Included in the Review

In all of the above six categories, there are 89 studies out of 107 studies rated with 2 as a relevance score. This indicates that most of the included studies in this systematic review contain content directly related to social media and youth suicide. Some studies were coded into multiple categories, so the number of studies for each subject in the Table 1 is higher than the entire 97 individual studies included for this review.

The goal of this literature review is to identify the research gaps and to present a summary of research to date. The data suggests the research gaps on social media and youth suicide are about sexting, offering online consultations, and detecting youth at risk of suicide (Table 1). These themes present with the least number of studies and we do not know much about them. Whereas, running youth suicide prevention awareness campaigns, cyberbullying, and disseminating information about self-harm techniques and pro-suicide content are the subjects receiving most attention from researchers worldwide with various academic backgrounds including computer science and information systems, psychology, social work, medicine and health sciences, law, and education.

Based on the findings of this review and our past research experience, it is imperative for future research to continue advancing how to detect youth at risk of suicide on social media. I suggest

future research should be done specifically on social media algorithms to detect youth at risk of suicide, especially the victims of cyberbullying and sexting. I think it is crucial to understand how youth in danger generate and share content on their social media including text, photos, and videos when they feel and are at risk. The ways they express themselves emotionally and interact with social media could be used as indicators to detect youth at risk of suicide beyond solely relying on the methods of sentiment analysis (positive, negative, or neutral topics) of the keywords of text posted on social media. As mentioned earlier in the introduction section, our recent study with urban indigenous youth in Ontario indicated that research participants could tell if their friends were at risk of suicide through (i) the language or verbal tone of the content that their friend has generated or shared on Facebook, (ii) the images they used and (iii) the changes in their relationship status. Changes in relationship status are new indicators to detect youth at risk (Intahchomphoo, Vellino, and Gundersen, under review).

Furthermore, most youth with suicidal ideation and the victims of cyberbullying and sexting do not normally seek help from adults, so their help often arrives too late. Since youth are at a stage of life when they face many changes, I think there should be more studies on developing social media algorithms to positively influence the moods of youth identified as being at risk of suicide. It is evident that social media could provide positive and hopeful alternative information to help alleviate their suffering. This same mechanism has been applied to targetted advertisements on social media like Facebook. Similarly, beneficial information could be injected into youth's social media news stream. It is a highly personalized process depending on the online behaviour of users and keywords in posts. Moreover, this news feed could be relevant or helpful to them for managing that risk, such as pointers to health and public services.

Thus, I would like to encourage other information systems and health researchers to explore more ways to how to create effective online consultations through social media and online referral systems for youth in peril to receive needed help as soon as possible. Researchers and practitioners from both information systems and health sciences need to work together to make it happen. I think this task requires an interdisciplinary team. Finally, it is also a good idea to develop more information systems to identify abusive persons who bully youth on social media. Such a tool would be useful for people in law enforcement.

5. Contributions and Limitations

This review identifies some important societal concerns regarding the links between social media and youth suicide. It identified key gaps in the literature in the particular areas of sexting, offering online consultations, and detecting youth at risk of suicide. The top research themes in the existing literature are about running youth suicide prevention awareness campaigns, cyberbullying, and disseminating information about self-harm techniques and pro-suicide content.

One limitation is that this review only searched for primary studies written in English. Another limitation is the format of publications. Conference proceedings, government studies, and books were not included in the selected databases.

Acknowledgements

This paper is a work of the Effects of ICTs on Well-being Project, funded by the Research Council of Norway at the TIK Centre for Technology, Innovation and Culture, University of Oslo. I would like to thank Dr. Erik Carlquist, postdoctoral fellow at the Department of Psychology, University of Oslo for reviewing the manuscript of this review.

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