Title
Indigenous Peoples, Social Media, and the Digital Divide: A Systematic Literature Review

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Peer reviewed

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The literature review in this paper includes various disciplinary perspectives from Indigenous peoples and communities in the United States, Canada, Australia, New Zealand, and other countries, as well as media and technology studies for Indigenous communities, peoples, and organizations. The past decade has seen a significant increase in the use of social media platforms such as Facebook and Twitter as their form of entertainment and social interaction was adopted globally.[1] Social media's political impact can be seen in multiple social movements (e.g., the "Arab spring" and Idle No More) that have resulted from its mobilizing of people to social action.[2] The ubiquity of applications on mobile devices has increasingly integrated social media platforms into many aspects of peoples' daily activities.[3] Businesses and governments, not to mention presidents and prime ministers, have turned to social media, not only to disseminate information, but also to learn about the target behaviors of online and offline end users mined from the information that they like, share, or comment upon.

Some previous studies on the use of technologies by Indigenous peoples argue that Indigenous peoples have always successfully capitalized on available technologies. James Emmett Murphy and Sharon Murphy, for example, trace the 150-year history of the American Indian press between 1828 and 1978 and the contemporary Indigenous print media's development into electronic outlets.[4] Historically, non-Indigenous presses often reported inaccurate information about Indigenous peoples. Michael Keith describes the rise of tribally sponsored broadcasting and Indigenous programming in commercial radio and television in the United States, and Enn Raudsepp similarly addresses the Indigenous press in Canada.[5] These two authors claim that the

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Indigenous press helps 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 social media affects Indigenous communities and also employ it for various purposes, including raising public awareness. Bronwyn Carlson and colleagues, for example, explore how Indigenous Australians used social media to create solidarity for a campaign to counteract stereotypes of Indigenous peoples propagated by Australian media.[6] Leaked video footage and photos of Indigenous youth being held in the Don Dale Youth Detention Centre in Darwin, Australia—where they were being tortured with tear gas, stripped naked, handcuffed, hooded, and strapped to a chair—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 officer returning an Indigenous boy to his alcoholic father. The cartoon was widely shared on social media, along with many racist comments looking down upon 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. The hashtag promptly became a powerful movement for other Indigenous Australians to raise public awareness. Many Indigenous men participated in the social media campaign and some posted tributes to their fathers and grandfathers.[7]

This real-world example demonstrates that social media can be used to combat negative stereotypes of Indigenous peoples in media representation and can contribute to what the authors called a "shared recognition" of Indigenous peoples' collective indignation at such stereotypic representation. Social media creates a space where Indigenous peoples can reinforce pride in Indigenous identity, ask the public for positive social change, and build resilience and community capacity to help and support their own peoples.[8]

Another example of social-media utilization by Indigenous organizations recently took place at the 2018 National Congress of American Indians (NCAI). The goals of the NCAI are to increase engagement and raise awareness between tribal nations, the US government, and the American public, to further opportunities for success and advancement of Native peoples, and to advance their nation-to-nation relationship with the United States.[9] The organizers began a social media campaign using the hashtag #SOIN2018 ("State of Indian Nations 2018"). Event speeches were broadcast live on the Internet and archived on the website. 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. Participants were also encouraged to share information about the event from NCAI's official Facebook, Twitter, and Instagram accounts and to share their thoughts on personal social media platforms using the hashtag #SOIN2018. This social media campaign was an excellent opportunity to share information and educate both Indigenous and non-Indigenous peoples about NCAI's State of Indian Nations project.

Given such campaigns' potential, a better understanding of the conditions that exacerbate the digital divide could have a significant impact on the well-being of

Indigenous populations who use social media to mobilize their causes into action. The goal of this paper is to examine the scholarly literature regarding how Indigenous peoples around the world are using social media, including the Indigenous peoples of the United States and Canada, and from it to determine what role various factors play in that usage, including barriers to accessing technology, attitudes, skills, and usage types—all of which make up the "digital divide," according to one definition.[10] Some elements of the literature also address whether computer access and connectivity issues faced by Indigenous peoples affect their use of social media.

This systematic literature review is also motivated by the Federal Communication Commission's 2018 Broadband Deployment Report, which states that from 2012 to 2014, one million people on rural tribal lands in the United States were able to obtain fixed terrestrial broadband Internet access after the Title II order. Between 2015 and 2016, however, deployment dropped dramatically, reaching only 330,000 people on tribal lands.[11] Clearly, inequity of access to technologies still exists for Indigenous peoples.

RESEARCH METHODOLOGY

The systematic literature review method originated in the Cochrane systematic review method. At first designed for evaluating and interpreting evidence-based literature on human health care, it has since been applied to social science fields 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[12] and this method has a specific methodology for locating, selecting, evaluating, and reporting studies that is transparent, reproducible, and neutral. This method requires review questions to be formulated at an early stage.[13] Crucially, only after a quality assessment are studies deemed relevant to the review questions and included in the systematic review.[14]

A systematic review of Indigenous peoples, the digital divide, and social media required searching literature across many disciplinary boundaries. I limited this transdisciplinary review 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. Scopus provides access to more science and engineering literature, while ProQuest and JSTOR offer a greater number of social science and humanities journals. Many core scholarly journals in Indigenous studies are indexed by Scopus, ProQuest, and JSTOR, including the *American Indian Culture and Research Journal*, *American Indian Quarterly*, *Ethnic & Racial Studies*, *Journal of American Indian Education*, *Studies in American Indian Literatures*, and the *American Indian Law Review*. The studies in those journals that meet the qualifying criteria were included in this review.

The methodology for selecting articles for this review did not capture studies not indexed by the data sources for this review, including 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*. However, I performed a manual search using all these terms on those journals from their websites' search engines and the University of Ottawa online library portal. These searches came up with no other relevant results. Also not included in my sample set are the government documents, studies in science and social science, essays, technical reports, conference proceedings, books, and theses that are not included in Scopus, ProQuest, and JSTOR. Naturally, these limitations preclude many valid sources of information. Another limitation is the format of the reviewed publications.

Rather than limiting the search to metadata fields such as the title, keywords and abstract, I conducted a full-text search. Because searching the full text means that any document containing the search terms will be retrieved, it maximizes recall of any potentially relevant study. However, a loss in precision also requires a more elaborate human filtering process because some irrelevant documents are retrieved that merely contain the keywords incidentally.[15]

I performed full-text searches in all three selected databases on the same day using the same search strings (fig. 1). The search expression was designed around three main concepts: "Indigenous peoples," "social media," and "digital divide."

(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

Figure 1. *First Search Strings*

While *Indigenous* is used throughout this paper as the preferred term in academic writing, particularly concerning Indigenous peoples in Canada and internationally, the term "aboriginal" also was included in the search in order to capture potentially relevant studies.[16] To ensure that studies concerning Canadian Indigenous communities were included, I also used the terms "First Nations," "Inuit," and "Métis," but not additional specific names of Indigenous peoples (e.g., Cree, Mi'kmaq, Algonquin). Thus, all the principal synonyms of Indigenous peoples in Canada occur in the first part of the search term.[17] Another limitation is that this review only searched for primary studies written in English. Of course, many countries with large Indigenous populations in South America and Africa were colonized by non-English-speaking countries. This review therefore does not include studies addressing the question of social media among Indigenous peoples in South America and Africa written in French or Spanish, for example.

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[18] and *social networking* refers to how people use social media tools to communicate and engage with other users to build online communities.[19] Various types of social media

include social networks, micro-blogging, online forums, online bookmarking, wikis, social news, and media-sharing.[20]

The third concept is referenced by the search string "digital divide." Van Dijk defines the *digital divide* as the technology access gaps between a certain demographic and other population groups.[21] Research by Michael Haight, Anabel Quan-Haase, and Bradley A. Corbett finds 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.[22] These demographic factors could have influenced access to the Internet and social media for many Indigenous peoples in the United States, Canada, and elsewhere. Researchers who may duplicate this literature review's methodological approach, however, should note other terms also being used in current discussions 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 on the digital divide may now use more precise phrases such as "spectrum sensing" or "technology adoption" which 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 only 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, with 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 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 Behavior 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: Table 1 (below) 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 (fig. 2) 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.

TABLE 1
STUDIES IDENTIFIED BY THE SEARCH STRINGS AND SELECTION CRITERIA

| 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
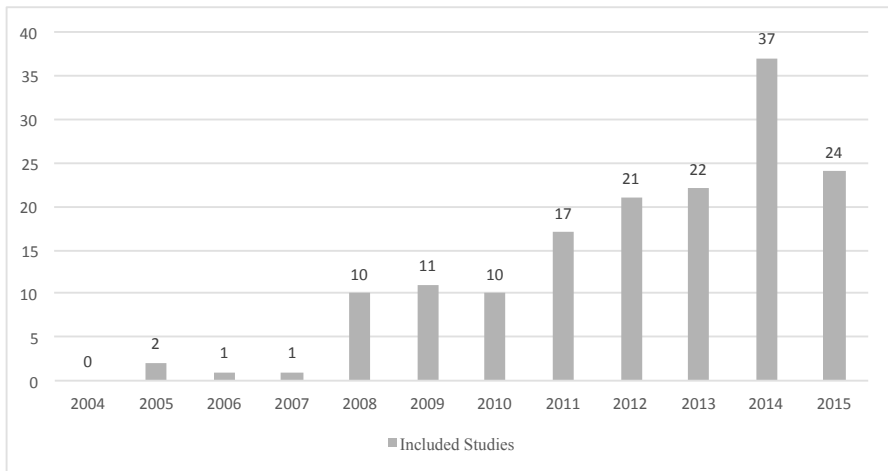
FIGURE 2. *Publication Years Timeline of Included Studies*

I reviewed the studies as follows: 157 results matching the search string in Scopus were reduced to sixty-four; in the ProQuest database 1,115 results were limited to sixty-eight; and in JSTOR, thirty-nine results were cut down to twenty-four because they were (1) in the wrong time period (before 2004/after 2015); (2) in another language besides English; and (3) presented in the wrong publication type, such as books, newspaper articles, and magazines. I then read the remaining studies to determine their relevance. Some examples of categories of irrelevant articles that were eliminated include mobile technology development; information and communication technology (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 twenty-nine studies answering the review criteria. The disciplinary basis represented in the twenty-nine peer-reviewed articles consisted of twenty-one articles from the social sciences and humanities, mainly from communication, information and media studies, political science, and geography; and eight 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" (fig. 3). This search yielded a slightly larger set of overall results but added no more relevant papers than the original twenty-nine studies that responded to the research questions. However, this new search yielded eighteen studies which further corroborate the findings in the initial collection.

> (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")

Figure 3. *Second Search Strings*

> (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")

Figure 4. *Third Search Strings*

In total, the two supplementary searches yielded an additional thirty-eight studies that provide corroborating evidence to support the findings in the twenty-nine main studies.

Principal 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 of whether the literature indicates any relationship between the digital divide facing Indigenous peoples and geography, socioeconomic status, and the availability of hardware and software. Within the rubric of the digital divide, my review of this literature identified five themes: (1) remote and rural; (2) low socioeconomic status; (3) hardware and software; (4) digital content; and (5) age and culture.

1. Remote and rural

Many Indigenous peoples currently reside in remote and rural geographic locations. According to Canada's 2011 Census, for example, 44 percent of Indigenous people live in remote and rural areas.[23] In 2011, the provinces with the largest Indigenous populations were Ontario, Manitoba, Saskatchewan, Alberta, and British Columbia.[24] Those remote and rural regions often have extreme climates and fewer natural resources. The colonizers called the new areas for Indigenous peoples "reserves," now numbering more than 3,100.[25]

Twelve papers in the sample identified this issue. A study by Guy Singleton and colleagues finds that for many Indigenous communities in Australia, remoteness and isolation is a major contributor to digital divide problems.[26] The extreme remoteness of the locations is directly linked to the poor quality of Internet connectivity. Stéphane Gauvin, Kevin Granger, and Marianne Lorthiois 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.[27] The Eeyou Istchee's wired Internet services operate on a fiber-optic network.[28] People in Kativik, the regional government operating in the territory of Nunavik, a roadless portion of northern Québec, can only access the internet through satellite. Indigenous peoples living in remote areas of the United States face the same Internet connectivity quality issues and some US reservations have no Internet access at all.[29]

For those Indigenous communities located in remote and rural areas, the very low rate of Internet penetration is explained by the high tariffs for Internet access. Eight papers in the sample identified this issue. The remoteness, vast geographic distances, and small populations of Indigenous peoples systematically increase the cost of telecommunication infrastructures because there are no incentives for private companies to invest in building them.[30] Therefore, Indigenous peoples do not have good connectivity to the Internet.[31] The high cost of Internet connectivity in rural and remote areas also forces many Indigenous peoples to live without Internet access or to use outdated Internet technologies.[32] The inaccessibility of the Internet and the high cost of Internet service are also challenging for Indigenous peoples in Latin America[33] and the United States.[34] Statistics in a study by Maria Kopacz and Bessie Lee Lawton show that only

a very small number of Indigenous peoples in the United States use YouTube.[35] The authors believe that this is because Indigenous peoples face problems with Internet access and lack necessary 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.[36] The review specifically focused on northern and remote regions where many Indigenous communities are located. Two papers in my sample identified this issue. A study by Rob McMahon and colleagues points out that in Canada, universal access to telephone service in both rural and urban areas is required by law, but the law does not apply to Internet service providers.[37] Since from a social policy standpoint the Internet is the new telephone, the authors propose that the Canadian government extend the law to cover Internet access. Another study from McMahon 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.[38] Some projects also received supplementary government funding. Indigenous peoples view this effort to bridge digital divides as a path to digital self-determination and self-governance.[39] These studies also emphasize that addressing this issue requires strong financial support from federal and provincial governments to invest in telecommunication infrastructures, which are the backbone of access to social media.

My review of the digital divide literature on the factors of remote and rural conditions also identified three closely linked subtopics: poor telecommunication infrastructures, harsh environmental conditions, and lack of local information technology (IT) professionals. Seven papers in my sample discussed these issues.

Poor telecommunication infrastructures. According to Guy Singleton and colleagues, the telecommunication infrastructures in many Indigenous peoples' remote and rural communities are in poor condition.[40] From the outset, Indigenous peoples in remote areas have had poorly developed or nonexistent Internet infrastructure and mobile phone networks,[41] creating more barriers for Indigenous peoples to access broadband Internet and social media.[42] A study by Clifton Westly Evers and colleagues indicates that in order to use social media effectively, young Indigenous peoples in remote communities in Australia need good-quality Internet and satellite connectivity.[43]

Harsh environmental conditions. In northern regions of Canada, many Indigenous people live where severe weather is very common. Harsh environmental conditions, particularly thunderstorms, often damage wireless towers and receiving dishes.[44] Thus, the telecommunication infrastructure in these harsh environments requires much maintenance and repair.

Lack of local IT professionals. Normally, Indigenous communities must hire telecommunication technicians from distant big cities to maintain their Internet infrastructures, in contrast to urban settings where well-equipped IT professionals are in ample supply. When severe weather conditions have disrupted Internet access, remote communities

often have to wait several weeks to reconnect. Furthermore, wages for trained technicians are higher in urban areas, so they usually prefer to work in cities rather than remote and rural Indigenous communities. Thus, many remote Indigenous communities suffer from limited technical support[45] and a shortage of well-trained Internet technicians.[46] When some IT projects were introduced to Indigenous communities in Australia, serious issues arose regarding how to keep the systems updated with current technology. A serious shortage of IT experts to undertake the maintenance technical work in Indigenous communities in Australia is causing information technology projects to be discontinued and limiting Internet access to Indigenous communities.[47]

2. Low socioeconomic status

Another factor in the digital divide is the generally low socioeconomic status of Indigenous peoples. As a whole, they are marginalized, live in poverty, and experience barriers in access to quality computer equipment, reliable Internet connectivity, computer skills, and basic literacy. All of these factors affect their ability to use the Internet and social media.[48] The studies in this review show that there are two specific enabling factors associated with the socioeconomic status of Indigenous peoples: low literacy and the affordability of technologies.

Low literacy. Eight papers in my sample identified this issue. Justine Stephens-Reicher and colleagues 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,[49] and Kristina Hinds Harrison reports the same correlation among peoples of the Caribbean.[50] 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[51] who need training in computer skills.[52] Yet, as discussed below, these conditions often impact the motivation to become computer literate.

A low level of literacy is also tied to low motivation to use social media, discouraging Indigenous peoples' willingness to use new technologies. Absence of motivation is a factor in the digital divide that is not easy to solve.[53] In a study on the barriers to mobile technology access among Berber-Muslim women in rural southwest Morocco, Leslie L. Dodson, S. Revi Sterling, and John K. Bennett also found a relationship between basic literacy skills and social media usage.[54] Oral interaction predominates for the Berber people, with most of these rural Moroccan women being neither literate nor formally educated, which is directly related to the problems they experience using mobile phones and social media. This study showed that because they cannot write, 85 percent of Berber women participants do not use texting or SMS functionalities on their mobile phones and social media. Instead, they use the voice capabilities of mobile phones for telephone conversations only.

Affordability of technologies. Twelve papers in my sample identified the issue of affordability. 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. Melissa K. Filippi and colleagues, Lyndon Ormond-Parker and Robyn Sloggett, and Justine Stephens-Reicher and colleagues identify such financial barriers as influencing the digital divide among Indigenous peoples globally.[55] In order to use social media, Indigenous peoples need mobile phones, laptop computers, tablets, and digital cameras that are affordable.[56]

Many remote Indigenous households in Canada still face challenges accessing the Internet via broadband, satellite, and Wi-Fi. Sheena Kennedy Dalseg and Frances Abele; Inge Kral; Guy Singleton and colleagues; and Jia Tina Du and Jelina Haines 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 and youth centers, and public libraries where they can connect to the Internet and use social media for free.[57] The same is true in Canada, which, in part, motivated the public and school libraries in Northeast Alberta to launch "the Inclusive Libraries Initiative" in order to turn their local libraries into spaces for Indigenous peoples to learn to use the Internet and social media.[58] The participating libraries have computers, free Internet, and staff to offer computer training.[59] The low literacy rate among Indigenous peoples means that guidance in the use of computers is needed and that availability of technical help from the trained staff at these public institutions is crucial.[60] 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 Internet and phone services.[61] Although YouTube in Malaysia has rapidly expanded, this does not apply to the Indigenous households in Sarawak State, who have lower access to computers and the Internet than the national average.[62]

3. Hardware and software

Cost of mobile phones. Six papers in the sample note that, due to the high cost of personal computers, many Indigenous people own mobile phones instead. A study by Stéphane Gauvin, Kevin Granger, and Marianne Lorthiois points out that Indigenous peoples in Canada are considered to have a predominantly outdoor 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.[63] As the cost of mobile phones has lowered, the popularity of social media among Indigenous peoples has increased, especially the younger generation.[64] Lyndon Ormond-Parker and Robyn Sloggett; Louise Jones, Kristen Jacklin, and Megan E. O'Connell; and Dandan Ma and colleagues demonstrate that mobile phones have become an important communication tool in remote Indigenous communities.[65] However, mobile phones are still out of reach for some groups of Indigenous peoples. For instance, the Berber Muslim study mentioned above indicates that some Indigenous women in Morocco do not have mobile phones due to their cost.[66] Berber Muslim women who own mobile phones use them for business, selling their Argan oil products privately and generating dependable income.

Supported languages on mobile phones. The same Moroccan Berber study in my sample found that the Berber Indigenous women bought preowned mobile phones originally designed for European users.[67] These phones support the Latin alphabet but not Arabic scripts. With phones that supported Arabic, users would be able to use a screen reader application and speech recognition commands to help them overcome the barriers illiteracy poses to accessing the full array of mobile phone functions.

4. Digital content

Limited content in Indigenous languages. Six papers in my sample identified this issue specifically, indicating that Indigenous peoples believe that the digital content available in Indigenous languages on the Internet and social media is very limited. With online content mostly written and spoken in English, it is rare to find Indigenous languages used on the Internet and social media. Globalization and colonization have resulted in English being the dominant language both online and offline,[68] which has led 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.[69]

This language bias limits many Indigenous peoples' engagement with these electronic tools.[70] Jason C. Young, for example, criticizes that Canadian Inuit interactions with one another on social media are primarily in English, which erodes the prevalence of Inuktitut among the Inuit and hence also has a deleterious effect on Inuit culture.[71] Similarly, Allison Mackey notes that the lack of culturally relevant content on social media makes it difficult to preserve and promote Indigenous culture.[72] Tanja Bosch 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.[73] 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.

Online censorship. Two papers in the sample identified the issue of censorship. A study by Hansen describes the Circassians (Adyghe) diaspora, a Sunni Muslim Caucasian ethnic group exiled from Russia in the nineteenth 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.[74]

Research conducted by Ariadna Matamoros-Fernandez reports that videos and pictures of Indigenous women in Australia with bare chests in traditional ceremonies were banned from Facebook. Indigenous activists disagree with this Facebook policy.[75] Matamoros-Fernandez 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, Indigenous activists 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 relevant to social media use. Three of these studies note that young Indigenous peoples are early adopters and frequent users of social media and the Internet.[76] Facebook has a high adoption rate and is used with high frequency among Indigenous youth and young adults in Canada, even in remote communities.[77] In general, however, Indigenous elders do not like to use new technologies, including social media.[78] In addition to the factors affecting social media use already discussed, such as low literacy rates and language issues, elders may see social media use as inconsistent with their traditional values. The traditional philosophy of Indigenous peoples does not put any emphasis on socializing with people via modern technologies. For instance, a study by Inge Kral shows that some young Indigenous people post photos or selfies on Facebook when looking for a date and to find potential romantic partners, but this practice encounters resistance from elders who believe that romantic relationships should develop from face-to-face interactions rather than mediated by social media.[79]

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. Indigenous diasporas foster the need for social media. A study by Wan Shun Eva Lam and colleagues found that among communities of Mexican migrants in the United States, Indigenous elders living abroad want to learn how to use social media to maintain ties with their places of origin in Mexico and continue to participate in social and cultural activities, as well as hear news.[80]

With greater affordability of Internet technologies and infrastructures for Indigenous peoples in remote geographies, opportunities are created for elders to share their social and political voices. Affordability means that Indigenous activists, who are usually the core leaders in protest movements, can now use blogs and Twitter to post their opinions, even if social media still can be a barrier for some Indigenous elders and they may need help from the younger generation to disseminate their cyberactivism campaigns on social media and the Internet.[81]

Principal Findings: Objectives

In analyzing these studies, I found that Indigenous peoples have four primary objectives when using social media: (1) cyberactivism; (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.

1. Cyberactivism

Twenty-two papers in my sample identified the topic of social media giving a voice to the voiceless. For Indigenous peoples, social media empowers their communities.[82] Since they are socially and economically disadvantaged, their voices are not often heard in the mainstream media and the Internet and social media provides them with an

opportunity to directly send their messages to the world.[83] For example, the Caribbean Organization of Indigenous People (COIP) has a blog that provides information to raise public awareness about the issues affecting Indigenous peoples. The blog functions as their official website and the content is updated regularly.[84]

Moreover, social media can be used by Indigenous peoples to encourage people to protest against inequality and injustice and demonstrate support of civil rights.[85] In Latin American countries, activists use social media to gather, recruit, and mobilize Indigenous peoples to demand their social and political rights.[86] The Acapu, an Indigenous group from the Amazon rainforest in Brazil, use YouTube, Facebook, and other social media tools to save the forest and fight against global warming.[87] 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.[88] They also used Facebook to create a fan page to publicly display the number of people who support their demands for justice.[89]

A case study from Africa about the Igbo Indigenous peoples, an ethnic minority in the South Eastern region of Nigeria, also 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.[90]

In Canada, local Indigenous peoples organized the Idle No More movement in the fall of 2012.[91] Using social media to coordinate, mobilize, and unite Indigenous peoples from various communities across Canada, they reached out to the public and demanded changes to Canadian government policies, raising issues of injustice that included their sovereignty rights, government funding, health care, cultural respect, and the environment.[92] 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 non-Indigenous allies.[93]

Furthermore, an investigation by Brian Beaton and Peter Campbell shows how Indigenous peoples in Keewaytinook Okimakanak, a remote and rural community in northwestern Ontario, used social media to build a virtual community specifically for activism.[94] They generated and shared information on social media about their decolonization movements, efforts at building community resilience, and stories of struggle, particularly experiences related to land rights issues. Inuit individuals and organizations in the Canadian Arctic also use social media for political purposes and transmit their voice internationally in order to resist the ongoing effects of colonialism.[95] In addition, a Facebook group of Indigenous peoples in Nunavut, "Feeding My Family," raises awareness about food insecurity in the Canadian Arctic and Subarctic regions.[96]

However, these are instances of cyberactivism enhancing an existing offline social movement. For Indigenous activists to achieve their objectives, social media cannot be

the only tactic. To make sure that their voices are heard by government, businesses, and others in positions of power, they still need to demonstrate on the streets. Thus, social media can be seen as a tool to bring together and coordinate the actions of people who share the same agenda before the in-person demonstration eventually occurs.[97] A study by Hansen states that online action on social media can mobilize offline, physical action.[98] Importantly, social media is a low-budget method for Indigenous activists to organize public demonstrations.[99]

2. Digital archives to preserve and promote culture

Importantly, more Indigenous content is produced in film and music formats than in print, in part because Indigenous languages are often spoken, rather than written, and many Indigenous communities share their culture from one generation to the next with oral histories. Indigenous films and music can be produced and shared via social media very easily[100] and social media can help to preserve culture for the sake of current and future generations, as well as to share their cultural knowledge and traditions with the rest of the world.[101]

Fourteen papers in my sample identified the issue of archives and culture. Yueh-Min Huang, Mu-Yen Chen, and Shuen-Shiang Mo found that social media can be used as a tool to preserve and promote Indigenous culture for educational purposes;[102] studies by Sheena Kennedy Dalseg and Frances Abele, and Wan Shun Eva Lam and colleagues note that this is especially true for Indigenous languages and music.[103] Timothy Pasch's research provides a good example of Indigenous cultural preservation and dissemination in the case of Indigenous television content now available on YouTube. Before the advent of the Internet, Indigenous peoples could showcase cultural videos they had produced for TV only on local community television channels.[104] Indigenous youth in particular are engaging on social media and are active online content producers. These youths use social media to record and transmit their cultural memories, revealing pride in their Indigenous cultural heritage.[105]

Furthermore, research by Maria Kopacz and Bessie Lee Lawton 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, such as the frequent representations of Indigenous peoples as uneducated, alcoholic, and unemployed.[106] In addition, the mainstream media continues to exclude Indigenous peoples: they are infrequently represented in movies, television, news, and newspapers.[107] Heather Molyneaux and colleagues 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.[108] A study by Alexa Woloshyn describes the Twitter endorsement by Indigenous fans of "A Tribe Called Red," a vibrant, Ottawa-based electronic pow wow band.[109] The fans' tweets show that the band'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 resilience in the face of oppressive negative

stereotypes. However, some types of social media usage aimed at preserving and promoting Indigenous culture have been controversial, drawing criticism from non-Indigenous social media users. Research by Jason C. Young reports that images posted on Twitter by Inuit to share their celebration of the traditional bear hunt were not well received by settler-colonial Canadians.[110]

A study by Bronwyn Lumby 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.[111] 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 Bronwyn Carlson demonstrates that Indigenous peoples in Australia also use Facebook to communicate with other individuals who share the same Indigenous identities.[112] Facebook is the preferred virtual space in which to represent Indigenous identities online. A related study by Jon Corbett, Guy Singleton, and Kado Muir 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. [113]

3. Connecting and maintaining relationships with other peoples

Twenty papers in my sample identified this topic. Various forms of social media are used as tools to connect and maintain relationships with other people within and between local Indigenous communities.[114] They are used to create community awareness and to inform the community about information and events.[115] Facebook is one social media tool that is extremely well designed for this kind of social communication. Anthony K. Webster shows that the Navajo people do not differ from most community groups in the ways that they express and exchange opinions on Facebook about their local government.[116]

In Canada, a study by Middleton and Crow notes that the Indigenous peoples of the Lac Seul Band Council in Ontario use Facebook more than local community websites in order to stay current with community news.[117] Another similar study by Heather Molyneaux and colleagues 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.[118] They use social media to maintain relationships and share and exchange information with other people within and between communities. Similar research conducted by Brian Walmark and colleagues 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. The same study found that Northern Indigenous women use social media more frequently compared to their male counterparts.[119] In addition, an investigative study by Brian Beaton and Penny

Carpenter 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.[120]

Other research that Inge Kral conducted in eastern Western Australia in the Western Desert region discovered that Indigenous peoples use Facebook to inform others about traditional ceremonies such as funerals, which people will travel from distant locations to attend.[121] Facebook can be used not only to inform other people about the news of someone's passing and help bring friends and relatives together for the funeral, but also to post collections of photographs about the event and to commemorate the deceased's life by enabling others to post their heartfelt messages and condolences. In addition, Facebook helps Indigenous peoples in Australia find and reconnect with long-lost family members. Many siblings and other relatives have discovered each other 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 was torn apart, as well in as other colonized countries. Now Indigenous families are able to reconnect through Facebook.[122]

Anicia N. Peters and colleagues undertook a case study on Facebook practices in Namibia, a country of diverse ethnic groups and languages, but with English as its official language. This study demonstrates that in this context, Facebook allows Namibians to share their own ethnic cultural practices, important events, and ceremonies with friends from other ethnic groups. Namibians post on Facebook in English because they want people in other ethnic groups to be able to understand and engage with their posts and thus social media becomes a way for Namibians to learn about the cultural differences within their country.[123]

In contexts where an Indigenous language is used in more than one country, social media can be used to reach a larger audience, bridging and connecting members of the same Indigenous group in different countries.[124] For example, Inuktitut is spoken among Inuit peoples across the Canadian Arctic, Alaska (United States), Greenland (Denmark), and Siberia (Russia), 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 internationally.[125] In an alternate example, Circassians communicate internationally via social media, not only in Circassian, but also, depending upon where they live, in Russian, Turkish, English, and other European languages.[126]

International migration is now a common phenomenon among some groups of Indigenous peoples and for those Indigenous migrants living in different countries who share the same cultural roots, social media enables the creation of virtual communities.[127] María Luisa Zúñiga and colleagues studied the Tunkaseño Indigenous communities, originally from Yucatan state in Mexico, now living in Southern California as migrants. Community members generally speak both Mayan and Spanish and frequently use Facebook to maintain interpersonal relationships and participate in community events locally.[128] A similar study by Wan Shun Eva Lam and colleagues found that Indigenous migrants from South American countries living in the southern United States, many of whom are of Maya heritage, use social media to maintain

relationships with families and friends in their original homes. 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 concerning the computer skills of elder Indigenous migrants; as discussed earlier, these elders often need their children's help in learning to use social media.[129]

4. Health education and virtual health support groups

Eight papers in my sample identified this topic. Social media can not only connect Indigenous peoples in hard-to-reach locations with health-care providers,[130] but can also serve as an online source of health information and education.[131] 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.[132] In the United States, health-care providers use Indigenous-language YouTube videos to disseminate information about respiratory diseases to Indigenous communities, especially those caused by unfiltered woodstoves.[133]

E-Liisa Laakso, Kylie Armstrong, and Wayne Usher 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 coping with illnesses.[134] 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 facing mental health illnesses and to promote their mental health programs and services. In Australia, many young Indigenous peoples live in isolated areas and suffer from stigmas attached to mental health disorders, which deters them from seeking help or openly talking to others about them. Social media also helps Indigenous youth to overcome these stigmas since they can ask for help on social media without publicly disclosing their identities. Ironically, one of the main criticisms of social media platforms is that they are typically poor at protecting privacy. In Laakso, Armstrong, and Usher's 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.[135]

Research by Kathleen Mathieson, Joan S. Leafman, and Mark B. Horton 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.[136] The authors suggest that Facebook can be a tool for implementing suicide prevention strategies. For example, Indigenous people at risk of suicide can receive uplifting advice from friends and family to help prevent suicide attempts and reduce suicidal ideation. In addition, Facebook makes opportunities for professionally trained officers or counselors to immediately intervene to save lives once those at risk have been identified. Facebook can be considered a pathway for modern, technology-based mental health interventions, especially in situations when face-to-face help might arrive too late.

Discussion and Conclusion

When compared to other uses of social media identified in the literature—digital archives, connecting and maintaining relationships with other peoples, and health education and virtual health support groups—the topic of social media cyberactivism in Indigenous communities receives the most research attention. Cyberactivism is studied in the context of many Indigenous communities around the world, especially in Canada, Australia, New Zealand, and the United States. These are all countries with a past and present practice of settler colonialism. This focus on the study of cyberactivism is understandable, given Indigenous peoples' ongoing history of colonial oppression, disempowerment, and inequality of treatment. While Indigenous peoples currently active on social media platforms are using them to demand justice and social change, they are also preserving their linguistic and cultural identity and individual well-being. As I learned from the findings covered in this review, culturally appropriate digital archives are in accordance with tribal traditions that guide how social media can be used to preserve and promote Indigenous culture.

The papers included in this review indicate that there are relatively few scholarly publications discussing the digital divide among Indigenous peoples' communities worldwide. A study by E. Gabriella Coleman affirms that neither academic literature nor mainstream media has devoted much study to Indigenous communities in relation to the digital divide.[137] The empirical research studies on the digital divide included in the first part of this review were primarily conducted with remote and rural Indigenous communities in Australia and Canada. No study was found researching the digital divide of Indigenous peoples in urban settings, although for decades many Indigenous Americans and Canadians looking for better employment, access to health care, and educational opportunities for their children have moved away from their reserves and into cities. The digital divide challenges facing many urban Indigenous people are likely to differ from those living in remote areas, partly because cities' problems with basic telecommunication infrastructure are different.

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. While the topic of cyberactivism among Indigenous peoples has already received considerable attention, given that Indigenous peoples are continuing to demonstrate worldwide, more research is needed about this important social phenomenon. It is also very important to understand several ongoing Indigenous civil rights movements in the United States and Canada as they continue to unfold. However, as this review demonstrates, Indigenous peoples use social media for a variety of purposes other than cyberactivism, and in the Canadian and American literature on Indigenous peoples, social media, and the digital divide, research is lacking in areas other than cyberactivism. Recently, discussions among Indigenous youth in the United States and Canada about suicide and mental health are increasing, and more research on how at-risk Indigenous youth express themselves on social media is urgently needed. In addition, we also need to understand how social media can best be used to help Indigenous youth facing suicidal ideation and mental health challenges. Moreover,

although this review demonstrates that Indigenous youth are heavily engaged with social media, most of the studies only investigate its use in rural and remote communities in the United States and Canada. In a global context of dramatic increases in rural to urban migration among Indigenous populations, including the United States and Canada, more research on urban Indigenous youth and social media is clearly needed.

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