POLICY *Brief*

▶▶ Citizen Science and COVID: Identifying the Needs of Rural and Remote Education

Tarun Katapally, Associate Professor, Johnson Shoyama Graduate School of Public Policy (JSGS), and Director, Digital Epidemiology and Population Health Laboratory; Prasanna Kannan, PhD Candidate, JSGS; and Eric Kwabia, PhD Candidate, JSGS

November 29, 2021

The effect of Coronavirus Disease (COVID-19) on educational institutions has been well documented, with activities of educational institutions across the globe being significantly affected by this pandemic.[1, 2, 3] In particular, the evidence shows that the pandemic has had a significant detrimental impact on both educators' and student mental health, with anxiety and depression rates climbing quickly.[1, 4, 5]

The pandemic required policymakers, educators, and administrators to respond rapidly to changing scenarios, such as evolving infection rates along with public health regulations.[5] However, several challenges deterred evidence-based safe school reopening, and preservation of school health. These challenges include a lack of trust in government guidance provided to schools,[6] school leadership, and educator confidence in policies.[5, 6]

To develop effective policies in the future, there is a need to understand the impact of rapid decision-making processes on school health. To do this, the Digital and Epidemeology and Population Health (DEPtH) Lab adapted an ongoing community trial that is being co-implemented with schools in rural on-reserve First Nations communities in Saskatchewan. Its objective is to understand the impact of COVID-19 on student and educator health. In Canada, Indigenous Peoples consist of three groups: First Nations, Inuit, and Métis. The discriminatory categorization of Indigenous Peoples in

COVID-19 SERIES: FROM CRISIS TO RECOVERY

This issue of *JSGS Policy Brief* is part of a series dedicated to exploring and providing evidence-based analysis, policy ideas, recommendations and research conclusions on the various dimensions of the pandemic, as it relates here in Canada and internationally.
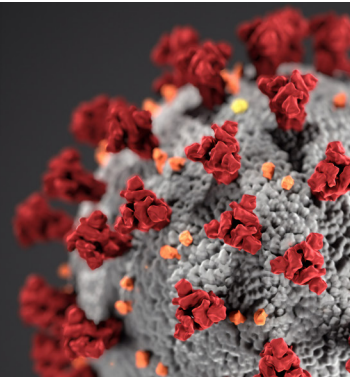
Canada is a complex subject, which is explored in Smylie and Allan's report, "First Peoples, Second Class Treatment".[7] A reserve is land allotted to First Nation bands in Canada under the Indian Act, where First Nation band members have the right to live, and form their administrative and political band political structures. First Nations do not have title to reserve lands, which are held in trust for bands by the British Crown.[8]

Historical and intergenerational trauma have contributed to greater health issues among many Indigenous communities.[9] Among the most stark evidence is that Indigenous youth in Canada have suicide rates two to three times higher than the national average.[10] Some studies have reported suicide rates as high as five to six times the national average.[11] Connected to these issues of mental health are culture loss, which includes both tangible losses of language, tradition and customs, and historical trauma. This complex phenomenon is in turn connected to "depression, self-destructive behaviour, suicidal ideation and attempts, anxiety, low self-esteem, and self-medicating to try and hide painful emotions".[12] Other issues that disproportionately affect Indigenous youth include gang involvement, lack of educational attainment, poor health, including teen pregnancy, sexually transmitted infections,[13] lower rates of quality physical health,[14] as well as intergenerational trauma resulting from the effects of residential schools.

Within this context, Indigenous perspectives are critical to understanding how the experience and response to COVID-19 has differed across communities. Given the unprecedented nature of the COVID-19 pandemic, this study assessed the effects rapid adaptation of school policies and practices had on the new remote learning reality. The purpose of this study was to engage secondary school administrators and educators in rural Indigenous communities in Canada to:

1. Understand rapid decision-making processes to preserve school health during the COVID-19 pandemic, including how these COVID-19 school policies influenced the health of educators and students; and,

2. Inform evidence-based safe school policies and practices during this evolving pandemic.

This paper describes the adaptation of the Smart Indigenous Youth study during the pandemic to collect perspectives of Indigenous school administrators and educators on school closure challenges, mental health, school leadership, and future curricula adaptations.

▶▶ A Digital Citizen Science Approach

The study we conducted is part of Smart Indigenous Youth initiative, a five-year mixed-methods digital health community trial that embeds culturally-responsive, land-based active living programs into school curricula to promote mental health, andminimize substance misuse among Indigenous youth (13-18 years old) in rural and remote First Nations Reserves in Saskatchewan. Smart Indigenous Youth is part of the Smart Platform, a citizen science and digital epidemiological platform for ethical population engagement, integrated knowledge translation, and policy using real-time interventions. Citizen science

is a participatory approach where participants, termed "citizen scientists", actively engage in the research process from data collection to knowledge translation, thus improving the probability of longitudinal participant compliance.

This digital citizen science approach enabled our research team to respond rapidly to the changing needs of our community partners and knowledge users (i.e., school administrators, educators, and youth). Although Smart Indigenous Youth is a five-year community trial, the digital platform allowed us to respond to the natural experiment of school restrictions during the COVID-19 pandemic. As (need first name) Leatherdale elaborates, it is important to evaluate natural experiments using innovative approaches, and we have not only utilized a digital platform, but also a citizen science approach to ensure rapid response.[15]

> Citizen science is earning a place in national science policies where citizens play an active role in democratizing policy. This transformative approach has particular implications for addressing societal crises such as the COVID-19 pandemic, particularly in disadvantaged rural and remote communities.

Citizen science can range from contribution (i.e., data collection) and collaboration (i.e., data interpretation) to co-creation of knowledge (i.e., co-conceptualization of research and knowledge translation) by engaging citizens throughout the research process.[16, 17, 18] Citizen science is earning a place in national science policies[13] where citizens play an active role in democratizing policy. This transformative approach[19] has particular implications for addressing societal crises such as the COVID-19 pandemic, particularly in disadvantaged rural and remote communities.

The DEPtH Lab integrated citizen science with Traditional Indigenous Knowledge to ensure Two-Eyed Seeing for participatory action research.[20, 21] Two-Eyed Seeing participatory approaches take into account both western methodologies and Indigenous Knowledges and Ways of Knowing to integrate them for culturally and geographically appropriate interventions. In essence, we have co-created knowledge in partnership with the knowledge users (i.e., principals, educators, and youth), which has implications for informing and influencing policy.

Ethics approval was obtained from the Research Ethics Boards of Universities of Regina and Saskatchewan through a synchronized review protocol (REB#2017-29). To ensure respectful data collection, this research study followed relevant articles outlined

in Chapter 9 of the Tri-Council Policy Statement 2,[22] the Canadian Institute of Health Research (CIHR) guidelines for working with Indigenous Peoples,[23] and the principles of Ownership, Control, Access, and Possession from the First Nations Information Governance Centre. A total of three administrators (two School principals [school one and two] and one vice-principal [school two]) participated as administrator citizen scientists. A total of 19 educators, including four out nine in school one, and 13 out 18 in school two participated as educator citizen scientists. Semi-structured interviews and focus group discussions were conducted virtually between September and October 2020 based on participants' availability.

▶▶ Primary Challenges

Internet Inequity

The closure of schools during the COVID-19 pandemic unearthed one of the core problems faced by schools in rural communities - lack of communication with students because of internet inequity among youth in rural communities. Internet inequity is defined as unequal access to the internet based on the wealth (high-, low- or middle-income), geographic region (urban, rural, or remote), socioeconomic status, gender, age, or ethnicity.[24] The lack of communication significantly impacted the ability of schools to successfully facilitate online learning when students had to stay home and study remotely.

Internet inequity also resulted in lack of communication with families, which was a major concern for administrators, especially in ensuring engagement with families of students who needed mental health and social support. As one administrator explained:

> "That's why that was a little disheartening, that was the biggest complaint from teachers, is that not everybody is communicating back, not everybody is picking up their phone, like I've lost all touch. I've lost all communication with this family, and that was worrisome".

To address the lack of online engagement with students, hard copy learning packages were sent to students' homes in both schools. This labour-intensive approach was also challenging because the success rate of obtaining completed homework from students was low in both schools. The immediate school closures during the initial phase of the pandemic did not provide sufficient time for sending learning packages to students' homes, which resulted in time management issues. According to another administrator,

> "…the biggest issue was getting things out to the students [...] we did the lot of homework packages, but then the question came upon getting them back. The teachers were more uncomfortable at the time taking the homework packages [of] the completed work marking and going back because of COVID threat…".

Nevertheless, both schools continued to support students to complete assignments by using all remote communication methods possible—phone, social networks, emails, etc. The new online environment was also challenging to educators, as many of the educators were not tech-savvy, which made it difficult to get acclimated to remote teaching methods: In the words of one school administrator

> "…there [was] some stress there, especially somebody you know some of our teachers who aren't so tech savvy, you know. All [of a] sudden being thrust to use your computer, and that might have been pretty tough…"

Mental Health

Administrators and educators reported enormous mental health challenges faced by students and educators during this period. They cited a wide range of issues that reiterate the negative impact of COVID-19 on school mental health: anxiety, stress, frustration, fear of a pandemic, fear of death, social deprivation, lack of routine and sedentary life, misinformation about COVID-19, and lack of confidence in using technology. The following administrator quotes enumerate the mental health challenges:

> "……. but actually over a time, especially among adolescents, there is whole lot of sleep time added in because when I started morning I taught till 12 or 1 o clock, and it was like ok I have to get them out of bed so I can speak for the younger one. But for the grade 9s, the change [is] definitely in their daily schedules" (Administrator 1).

> "…there was a little bit of that fear factor, and kids knowing—just talking—with the teachers. When we got back, the reaction with their kids or grandkids that they were looking after, the biggest thing was the miscommunication [...] the kids thought that they were going to die if they went outside. Oh yeah, I thought, wow, that's from watching the news right, and they're hearing all of this stuff on there and I'm sure parents were watching the news with them as well, but one of our high school teachers said that, yeah, her kids didn't want to go anywhere, you know, even though they were fully masked and everything. She didn't figure this out until after. Like why are you so [...] why don't you want to come with us? Why don't you want to go anywhere? Well, because I thought [it] was the fear of death" (Administrator 2).

The mental health impact of COVID-19 across the world has been significant[25] and our analysis shows how misinformation and fear play a role in causing stress and anxiety among students and educators.

▶▶ Primary Recommendations

Digital Mental Health Supports

It is clear that school closures due to the COVID-19 pandemic have adversely affected children and families, and placed an excessive burden on educational institutions around the world.[26, 27] Our study results revealed how prolonged school closures and lack of access to technology and connectivity affected the mental health and well-being of children and educators, which corroborates existing evidence.[5, 28] As schools are also places that provide non-academic supports to students, such as providing physical activity access, mental health services, and food supplementation sources, it is essential to invest in school policies that preserve holistic health.[29] It is evident that substantial mental health supports are required

for both educators and students to not only cope with the current pandemic, but also for future health crises.[30]

The administrators and educators were emphatic about the need for embedding digital health solutions into school policies, especially because they do not have the same access that urban areas possess. Digital mental health supports provides an opportunity to engage with youth and educators in real-time to minimize risk and provide appropriate guidance.[31, 32] More importantly, while schools are functioning remotely, digital technologies can enhance curricula that integrate mental health and suicide prevention.[33] However, it is critical to address internet inequity,[24, 34] which was highly prevalent among students, and enhance digital literacy, which the educators struggled with, before digital mental health supports are built.

Policy for Digital Literacy and Internet Equity

Our study found no significant differences between the two schools that took part in the analysis. It showed that in developing sustainable curricula beyond COVID-19,[35] administrator and educator citizens identified building digital competencies of both educators and students, and increasing availability of computers and internet access to students, particularly at home, to promote online learning. It was apparent that educators struggled with rapidly moving to online curricula, however, they were open to improving their own digital competencies and literacy to ensure appropriate delivery of online curricula in the future. This foresight needs to be combined with effective development and implementation of digital literacy programs that advance skills of both educators and students.

One of the biggest issues highlighted by the educators was the need to enhance communication with parents, and students. The lack of access to internet at student homes is a significant challenge in rural Indigenous communities in Canada, a systemic issue that needs to be addressed to enhance equity. The United Nations[36] has determined that access to internet is a human right,. With that as a foundational principle, the COVID-19 pandemic has revealed the existing inequities in access to internet, drawing particular attention to students who do not have access suffering the most. The Government of Canada has pledged to provide internet access to all rural areas by 2030,[36] which is a positive step to provide more equal educational access to students. But more must be done. For example provincial governments need to step up to provide direct educational funding to rural and remote areas so that students can access the internet, which is key to their educational achievement.

Conclusion

The COVID-19 pandemic has changed our perceptions of digital technology and clarified the importance of internet access and digital literacy. It is true that some things will never return to pre-pandemic status quo—one of them being school curricula. This fact has particular implications for rural schools, especially in Indigenous communities. Embracing digital mental health supports and internet equity are imperative, and the time is now for governments to act in a coordinated and collaborative manner.

References

View the online version of the Policy Brief for a complete list of references (www.schoolofpublicpolicy.sk.ca).

Tarun Katapally

Dr. Tarun Katapally is an Associate Professor and Patient-Oriented Research Leader at the Johnson Shoyama Graduate School of Public Policy. He holds an adjunct faculty position in the College of Medicine at the University of Saskatchewan and is a research affiliate with the Saskatchewan Centre for Patient-Oriented Research. He established the Digital Epidemiology and Population Health Laboratory (DEPtH Lab) in 2017, which implements the SMART Platform by combining the concepts of citizen science, community-based participatory research, and systems science. Internationally, he is the India lead for the generation of the Global Report Cards on physical activity of children and youth, a knowledge translation endeavour to inform policy on active living across 49 countries. Dr. Katapally's expertise is linking advanced mixed-methods and complex analytical techniques with citizen science and community-based participatory research to understand the impact of policy and policy-driven contexts and systems on the health and wellbeing of populations.

Prasanna Kannan

Prasanna is a public health professional, a social worker, and a PhD candidate at the Johnson Shoyama Graduate School of Public Policy at the University of Regina. Her current research under the supervision of Dr.Tarun Katapally involves the use of digital epidemiological tools to promote the well-being of vulnerable populations.

Eric Kwabia

Eric is a nurse, an ehealth expert, and a population health researcher. Currently, he is a PhD candidate at the Johnson Shoyama Graduate School of Public Policy at the University of Regina, under Dr. Tarun Katapally's supervision. Eric is ardent about health research interventions using the SMART Platform to develop innovative policies that promote general well-being.

For more information on the Johnson Shoyama Graduate School, visit www.schoolofpublicpolicy.sk.ca