A PRE-SERVICE TEACHER'S VIEW ON EMERGENCY REMOTE EDUCATION IN RURAL NOVA SCOTIA: A SCOPING REVIEW OF LITERATURE ON DIGITAL EQUITY AS ILLUMINATED BY COVID-19

MEAGAN KETTLEY, JENNIFER MITTON *St. Francis Xavier University*

ABSTRACT. This article presents a scoping review of literature on the impact of emergency remote education in low-income rural settings to contextualize the experiences in rural Nova Scotia during the COVID-19 pandemic. The initial literature reviewed included 37 articles across Western nations, the majority subscribing to an investigative methodology with participant interviewing, field observations, and in-depth reviews of literature as the most common sources of data collection. Due to the unprecedented nature of COVID-19, little is known about this topic. This review provides insights into the experiences of emergency remote education in low-income rural communities from the perspective of students, pre- and in-service teachers, and rural education stakeholders, and suggests a need for integrating pandemic-informed rural pedagogy into teacher education programs.

LE POINT DE VUE D'UNE ENSEIGNANTE EN FORMATION INITIALE SUR L'ENSEIGNEMENT À DISTANCE, EN CAS D'URGENCE, DANS LES RÉGIONS RURALES DE LA NOUVELLE-ÉCOSSE : UNE REVUE DE LA LITTÉRATURE SUR L'ÉQUITÉ NUMÉRIQUE À LA LUMIÈRE DE LA COVID-19

RÉSUMÉ. Cet article présente une revue de la littérature portant sur l'impact de l'enseignement à distance d'urgence dans les milieux ruraux à faible revenu, afin de contextualiser les expériences vécues dans les régions rurales de la Nouvelle-Écosse pendant la pandémie de COVID-19. La littérature examinée comprenait 37 articles provenant de pays occidentaux, dont la majorité adoptait une méthodologie d'enquête reposant sur des entrevues, des observations du terrain et des analyses littéraires comme principales sources de collecte de données. Cette revue offre un aperçu des expériences de l'enseignement à distance d'urgence dans ces communautés, adopte plusieurs points de vue et souligne la nécessité d'intégrer une pédagogie rurale éclairée par la pandémie dans les programmes de formation à l'enseignement.

Little is known about the academic impact of the unprecedented shift towards emergency remote education that resulted from COVID-19's suspension of public gatherings in spring 2020. To understand this phenomenon from the standpoint of rural Nova Scotia (NS), this scoping review will examine what is evident in both the literature that pre-existed and has since emerged from the pandemic: COVID-19 not only illuminated but amplified the conditions of inequality for students who experience rural poverty. One way to begin understanding how great this impact may be is by investigating the experience of emergency remote education from the perspective of pre-service teachers. For context, at the time of writing, one of the authors of this article was a pre-service teacher who grew up in rural NS and returned to this setting for their 2020–2021 placement, where they bore witness to some of the concerns to be described in this article. It is with this reflexivity that we acknowledge the future of rural education as heavily reliant on pre-service teachers' preparedness to teach in post-pandemic conditions, which is tied to their understanding of rural poverty and the conditions that circumstance it. This review will focus on learners in low-income rural communities, with some discussion of intersections with students' racialized identities.

Understanding the impact of poverty in rural NS

Poverty across NS is not evenly distributed; rates of child poverty are highest in marginally rural locations (Corbett, 2014; Frank et al., 2020). Rural poverty is distinct from urban poverty, particularly when considering the lack of amenities and public infrastructure in rural communities (e.g., libraries, shopping centers, public transport; Dolan, 2016; Nelson, 2007; Looker & Bollman, 2020). Understanding rural poverty as separate from urban poverty needs to be an area of focus in educational research in Canada, including in NS (Bennett, 2013; Corbett, 2014; Looker & Bollman, 2020; Smith & Peller, 2020; Corbett & Gereluk, 2020). Yet, little is known about those experiencing rural poverty generally, despite growing concerns amidst a background of COVID-19.

In 1989, the House of Commons passed a motion that sought to eliminate child poverty in Canada by the year 2000; at the time this motion was passed, the child poverty rate for children living in NS was 24.4%, or 56,960 children, calculated using the Census Family Low-Income Measure (CFLIM-AT), a relative measure of poverty that compares income nationally (Frank et al., 2020). While all other provinces saw a decrease in their rates, the number of NS children living in poverty increased by the year 2000 to 27.8%, and only marginally declined to 24.6% in 2018, meaning that 1 in 4 children in NS are living in poverty (Frank et al.,

2020). Similarly, using the Market Basket Measure (MBM), an absolute measure, Frank et al. (2020) further revealed that NS has the highest rate of child poverty in Canada (14.8%). The number of individuals living in poverty is anticipated to have increased since the onset of the pandemic; recent data shows that, with the closure of schools and childcare centres, many parents of young children had to stay home from work, regardless of whether they could afford to or not, a matter especially true for low-income single mothers (Bansak & Starr, 2021; Grooms & Childs, 2021; Kast et al., 2021).

SEARCH RESULTS: DESCRIPTIVE OVERVIEW

This review conceptualizes emergency remote education herein as the educational response to the initial COVID-19 public lockdown in the spring of 2020. Although this review uses the terms "at-home" and "online learning" interchangeably with the term "emergency remote education," the latter is a more appropriate and accurate description of the educational shift that took place during that initial lockdown (Literat, 2021). Wherever possible, this review will contextualize discussions about online education to the spring of 2020. Additionally, we lend our understanding of *rurality* from Looker and Bollman's (2020) use of the term as a "spatial concept" (p. 23). As such, rurality is situated in population density, or "distance-to-density," and its makeup of socioeconomic status (Bollman, 2021, p. 249; Looker & Bollman, 2020).

A literature search was conducted with the keywords "online learning," OR "remote education," AND "COVID-19," AND "poverty," OR "low-income," AND "rural," AND "teacher education" using such online research databases as: ProQuest Research Library (ProQuest, including Education Resources Information Center [ERIC]), SAGE Journals Online, and Taylor & Francis Journals Online. The search was limited to these databases to ensure that the primary literature and secondary literature presented were relevant to education-related research. The initial searches were limited to English language peer-reviewed articles published between January 1, 2020, and April 30, 2021 (a 1-year-4-month time period) to yield results relevant to the COVID-19 pandemic. However, due to the limiting circumstances of the pandemic's timeframe, a secondary search was conducted using the same databases, but with new and/or altered keywords: "Nova Scotia," AND "rural education," AND "poverty," OR "low-income." This secondary search was expanded to consider publications between January 1, 2010, and December 31, 2020 (a 10-year period). This allowed for investigation of a broader understanding of rural poverty and education, as it stood prior to the pandemic.

A total of 52 articles were identified using these search methods, with 37 remaining once titles and abstracts were reviewed to determine if they were appropriate for further consideration. For example, articles that focused on emergency remote education in urban contexts were excluded. Additionally, in an effort to seek information that closely reflected the conditions of rural NS, literature was excluded if it did not fit within the Western context (i.e., North America, Great Britain, Australasia). Special consideration was given to research done within Canada, specifically the Atlantic provinces, with a focus on NS.

These search parameters resulted in a range of qualitative and quantitative methodological orientations: 12 qualitative (generic qualitative / interpretive or case study), 1 mixed method, 5 quantitative (descriptive and/or correlational), and 12 literature reviews and reflective papers. Of the 37 studies reviewed, the majority subscribed to an investigative methodology with participant interviewing, field observations, and/or in-depth reviews of literature as the most common sources of data collection. Most of the studies were completed in the United States (15) and Canada (16), with the remainder conducted in Great Britain (2), Australia (2), Austria (1), and New Zealand (1). Few studies looked at the impact of rural poverty in NS on primary and secondary education; as such, this review expanded its search to include pre-service teachers' perceptions of rural poverty in other parts of Canada, and also included pre- and in-service teachers' perceptions of rural poverty in the United States in an attempt to support a comprehensive look at the conditions of rural poverty. Wherever possible, the primary focus of this work was directed towards research done within Canada.

To contextualize the 37 studies and their findings, the following table (see Table 1) identifies primary and secondary themes related to the matter of online learning in low-income rural communities. It also points to the presence of pandemic-specific studies in relation to educational research. Following the table, a review of the more salient themes is presented: pre-service teachers' understanding of rural poverty; racialized identities; home environment; conditions for digital equity; returning to in-person learning; and post-pandemic teacher education and professional development. These themes have strong overlapping issues, with some of the same studies appearing in multiple sections.

TABLE 1. *Thematic overview of articles' primary and secondary findings*

Theme	... as a primary focus		... as a secondary focus	
(Post-Pandemic) Teacher Education Programs & Personal Development	GBR	Ellis et al. (2020)	NZL	Starkey et al. (2021)
	USA	Grooms and Childs (2021)	CAN	Cherubini (2020)
	CAN	Van Nuland et al. (2020)	AUT	Kast et al. (2021)
	USA	Alonso (2020)	USA	Hall et al. (2020)
	CAN	Hill et al. (2020)	USA	Quezada et al. (2021)
	USA	Kaden (2020)	USA	Quinn et al. (2022)
	AUS	Howard et al. (2021)	CAN	Power et al. (2020)
	USA	Trust and Whalen (2021)		
	USA	Panther et al. (2021)		
(Concern for and Creating Conditions for) Digital Equity	NZL	Starkey et al. (2021)	CAN	Cherubini (2020)
	USA	Literat (2021)	GBR	Cahoon et al. (2021)
	USA	Bacher-Hicks et al. (2021)	AUS	Howard et al. (2021)
	USA	Dolan (2016)	CAN	Hill et al. (2020)
	AUT	Kast et al. (2021)	USA	Quezada et al. (2021)
	USA	Hall et al. (2020)	USA	Kaden (2020)
	USA	Bansak and Starr (2021)	CAN	Van Nuland et al. (2020)
	USA	Grooms and Childs (2021)	USA	Quinn et al. (2022)
			CAN	Goodnough and Mulcahy (2011)
			AUS	Boylan and McSwan (1998)
(Pre-Service Teachers' Understanding of) Rural Poverty	USA	Nelson (2007)	USA	Dolan (2016)
	CAN	Goodnough and Mulcahy (2011)	USA	Parolin (2021)
	CAN	Frank et al. (2020)	USA	Alonso (2020)
	CAN	Hellsten et al. (2011)	CAN	Parker (2017)
	USA	Kaden (2020)	USA	Hall et al. (2020)
	USA	Quinn et al. (2022)	CAN	Bennett (2013)
	GBR	Cahoon et al. (2021)	CAN	Looker and Bollman (2020)
	USA	Fontichiaro and Stephens (2021)	CAN	Stelmach (2020)

	CAN	Peterson et al. (2018)	CAN	Corbett and Gereluk (2020)
	CAN	Corbett (2020)		
	AUS	Boylan and McSwan (1998)		
	CAN	Murphy et al. (2020)		
	CAN	Gereluk et al. (2020)		
	CAN	Smith and Peller (2020)		
(Intersections with Students') Racialized Identities	CAN	Cherubini (2020)	USA	Literat (2021)
	USA	Parolin (2021)	USA	Bansak and Starr (2021)
	USA	Alonso (2020)	CAN	Frank et al. (2020)
	CAN	Peterson et al. (2018)	CAN	Hill et al. (2020)
	AUT	Kast et al. (2021)	USA	Quezada et al. (2021)
	CAN	Power et al. (2020)	USA	Fontichiaro and Stephens (2021)
	USA	Grooms and Childs (2021)	CAN	Hellsten et al. (2011)
	CAN	Scott and Louie (2020)		
(Intersections with Students') Home Environments	USA	Literat (2021)	USA	Parolin (2021)
	USA	Bansak and Starr (2021)	CAN	Parker (2017)
	USA	Bacher-Hicks et al. (2021)	CAN	Frank et al. (2020)
	AUT	Kast et al. (2021)	USA	Quezada et al. (2021)
	GBR	Cahoon et al. (2021)		
	USA	Fontichiaro and Stephens (2021)		
	USA	Grooms and Childs (2021)		
	CAN	Schiff et al. (2020)		
(Concerns for) Returning to In-Person Learning	CAN	Hill et al. (2020)	CAN	Cherubini (2020)
	AUS	Howard et al. (2021)	USA	Quezada et al. (2021)
			USA	Literat (2021)
			USA	Trust and Whalen (2021)
			USA	Panther et al. (2021)

Pre-service teachers' understanding of rural poverty

A small cluster of educational research has focused on the formation of teacher identities in rural contexts within Canada (Goodnough &

Mulcahy, 2011; Hellsten et al., 2011; Corbett, 2014; Smith & Peller, 2020; Bennett, 2013; Gereluk et al., 2020; Looker & Bollman, 2020). The results are marginally consistent in that perceived preparedness to teach in specific school communities is connected to pre-service teachers' experiences at their practicum school placements (Goodnough & Mulcahy, 2011; Hellsten et al., 2011; Murphy et al., 2020; Smith & Peller, 2020). For example, Goodnough and Mulcahy (2011) found that the placement of pre-service teachers in rural and remote schools is necessary for recruitment, for it provides invaluable first-hand experience that addresses preconceived biases about rural education, and prepares teachers for its realities; seeing that several programs do not place pre-service teachers in these areas, scholars have made recommendations for teacher education programs to adopt this practice (Alonso, 2020; Boylan & McSwan, 1998; Hellsten et al., 2011; Hill et al., 2020; Peterson et al., 2018). Despite the recognized need, the inability to recruit and retain teachers in rural settings remains significant (Looker & Bollman, 2020), a challenge which Smith and Peller (2020) have discussed in relation to the problem of transporting teachers to rural areas for their practicum placements when teacher education programs are primarily urban, resulting in a lack of practicum training within rural settings. Moreover, consistent across multiple studies (Goodnough & Mulcahy, 2011; Hellsten et al., 2011), when we consider those teachers who are actually placed in remote settings, they often have poor experiences, most attributed to the lack of rural-specific pedagogy in their teacher education programs (Kaden, 2020; Hellsten et al., 2011). For example, Hellsten et al. (2011) reported that participants expressed several unexpected challenges during their 1st year teaching in rural and/or northern Saskatchewan schools, including feelings of isolation (social, geographical, professional, etc.) and lack of acceptance from community members. Such a finding is consistent across this body of research.

Teacher education programs beyond Canada and across Western contexts accord primary importance to diversity and the inclusion of culturally responsive pedagogy as a means of leveraging students' backgrounds to enhance their learning. Yet, according to our review, few teacher education programs offer rural-specific strategies (Corbett, 2014; Hellsten et al., 2011; Hill et al., 2020). Related to this finding, both Goodnough and Mulcahy (2011) and Murphy et al.'s (2020) studies have highlighted the benefits of introducing rural-specific contexts into teacher education. Goodnough and Mulcahy observed teacher candidates who both lived and taught in rural communities during their practicum, and though their time was brief, those participants reported positive experiences, claiming

the practicum to have formed a new interest in living and beginning their career in a rural community, as well as influenced their likes, dislikes, and misconceptions about teaching in rural communities in general. Murphy et al.'s inquiry of 1st-year teachers' experiences in rural settings produced similar results, finding that there were various benefits to rural placements for pre-service teachers, including an increased sense of belonging to a community and improved relationships with students and their families as a result of their connection and investment in the community.

However, Murphy et al. (2020) returned to identifying an important gap in teacher education, of not preparing new teachers for the diverse experience of children and families in rural communities, and, along with this, questioning whether teacher education is recognizing the need to differentiate rural schools and education from urban contexts. These findings are telling of the need for teacher education programs to adopt rural-specific contexts in order to reflect the diverse classrooms and communities in which they are preparing their pre-service teachers for.

Few studies have emerged to address how this need will now extend into post-pandemic teacher education programs in rural contexts (Hill et al., 2020; Alonso, 2020; Cherubini, 2020). On a positive note, Hill et al. (2020) reported the need to address teachers as both researchers and community leaders, suggesting that in-service teachers should be included in the formation of teacher programs moving forward so as to tackle the anticipated educational shift that COVID-19 has likely caused. However, we found no research that included the need to implement rural-centred pedagogies into post-pandemic teacher education programs, even though in-service teachers were faced with rural-specific challenges, such as geographical isolation from education resources (Alonso, 2020). The lack of research specifically addressing pre-service teachers' understanding of rural poverty is an increasing concern for education, especially as the rates of rural poverty increased with the pandemic's economic collapse (Cherubini, 2020; Ellis et al., 2020; Frank et al., 2020).

Intersections with students' racialized identities

In response to the pandemic, a number of studies explored the impact of rural poverty on students of racialized backgrounds (Cherubini, 2020; Parolin, 2021; Literat, 2021; Grooms & Childs, 2021; Kast et al., 2021; Scott & Louie, 2020). Much attention in the literature is given to the lack of infrastructure and support related to the necessary technology needed to sustain at-home learning (Bacher-Hicks et al., 2021; Literat, 2021; Power et al., 2020). In the context of Canada, much of this concern is directed towards Indigenous youth. For instance, according to Scott and

Louie (2020), 1 in 4 of Canada's Indigenous population is under the age of 15, and 60% of Indigenous people live in rural areas of a "small population centre" (p. 114). On average, those who live on reserves have lower levels of technological skills "due in part to the systemic barriers to accessing technology" for Indigenous communities (Cherubini, 2020, p. 1). In addition to a lack of resources, Indigenous people are more likely to be affected by poverty and health-related issues, and during the peak of the COVID-19 outbreak, suffered higher rates of infection than the general population, severely impacting their ability to actively participate in education (Power et al., 2020).

The bulk of studies reviewed focused upon African American and Hispanic students, as they experienced greater health-related risks in the face of the pandemic (Bacher-Hicks et al., 2021). In the United States, African American and Hispanic children are twice as likely to experience poverty; as of April 2020, 17% of all African American and Hispanic children experienced poverty and food insecurity (Parolin, 2021). Bacher-Hicks et al. (2021), according to their analysis of high frequency internet search data, found African American students in rural areas reported lower increases in searches of online learning resources. In a similar study, Bansak and Starr (2021) found that African American and Hispanic parents spent less time helping their children with their at-home learning than White and non-Hispanic parents, which was credited to a variety of factors, such as the scarcity of parental time, potential language barriers between parents and online instructors / teachers, and varying levels of parental education. The additional influences of rural poverty — such as food insufficiency (Parolin, 2021), lack of adequate internet and technological resources (Literat, 2021), and poor infrastructure within the home, school, and community (Cherubini, 2020; Power et al., 2020) — are all compound factors contributing to the disparities in education that racialized learners experience.

Intersections with students' home environments

Several studies, both pre-existing and post-pandemic, have focused upon the home environments of low-income rural students (Literat, 2021; Bacher-Hicks et al., 2021; Fontichiaro & Stephens, 2021; Cahoon et al., 2021; Bennett, 2013; Stelmach, 2020). Scholars are troubled with the lack of infrastructure in rural North American contexts supporting the implementation of broadband connectivity, and available funding to provide equal opportunities for technology across all students (Dolan, 2016; Hall et al., 2020; Kaden, 2020; Parolin, 2021; Looker & Bollman, 2020). Children in low-income households were less likely to have access

to digital resources during the height of the pandemic, which isolated students in low-income rural households both academically and socially (Bacher-Hicks et al., 2021; Bansak & Starr, 2021; Cahoon et al., 2021). Even for students in low-income rural households who reported having sufficient internet connection, a variety of other digital concerns came into account. For example, some students reported that having to share one computer with several siblings made at-home learning nearly impossible (Literat, 2021). Other student accounts included reports of not having access to a computer at all and having to complete their learning from their smartphone, which often did not easily support commonly used platforms at the onset of the pandemic (Bacher-Hicks et al., 2021; Fontichiaro & Stephens, 2021). Additionally, rural homelessness amongst children and youth prevented students from participating in emergency online learning (Schiff et al., 2020).

Emergency remote education also illuminated other concerns for educators. Literat (2021) emphasized the concern for providing instruction through video conferencing, from a socioemotional perspective; for example, in analyzing student-made videos through the online platform Tik Tok, she noted that the "cameras on" approach forced students to share their home environments with their classmates, which sometimes led to classmates learning of abusive home lives and economic disparities, thus further isolating them socially from their peers. Relatedly, Fontichiaro and Stephens (2021) noted two negative consequences to the cameras on approach: one being that parents would weigh in negatively on what their children were being taught (i.e., things that may conflict with parental views being scrutinized), and, conversely, teachers would weigh in on students' home life, where, in some cases, teachers were seen to be commenting on students' political / cultural beliefs, and, coincidently, the parenting of their students. As part of this discussion, scholars argued that the pandemic's economic consequences on the home environments of low-income rural students significantly impacted their socioemotional well-being, resulting in an inability to sufficiently participate in at-home learning regardless of access to technology (Cahoon et al., 2021; Hall et al., 2020; Kaden, 2020; Starkey et al., 2021; Trust & Whalen, 2021). In addition to scholars' having made recommendations for improved funding and infrastructure to provide students with the resources needed to learn from home, both Literat (2021) and Trust and Whalen (2021) made suggestions for the adoption of a pedagogy of care, calling educators' attention to the vulnerability and socioemotional well-being of low-income students who could not sufficiently learn under the conditions of the pandemic.

Concerns for, and creating conditions for, digital equity

The concept of accessing educational technology is multifaceted; as technology in education advances, how the term "digital divide" is defined becomes more complex. The term "digital equity" is a more appropriate term to address this phenomenon, especially in light of the pandemic, for it concerns the need for fair and equal access to technology and broadband connectivity as well as the need for an acquired literacy and skillset to use these educational tools proficiently (Dolan, 2016). To address the complexity of digital equity in rural communities, and the depth of the pandemic's impact on these communities, we must reemphasize rurality as a spatial concept. Definitions of rurality are often complicated by the idea of "digital deserts," conditions under which experiences differ adversely from more privileged rural settings (rural areas in close proximity to urban centers, higher income status, etc.). Additionally, recognizing that roughly 60% of Canada's Indigenous population live in rural areas, with the majority of this sector living on reserve (Scott & Louie, 2020), we include this population in the discussion of digital deserts due in part to the "systemic barriers related to accessing technology" within many Indigenous reserves and communities (Cherubini, 2020, p. 1). We acknowledge this in our efforts to recognize that there may not have been a universal experience of lockdown across rural communities (Looker & Bollman, 2020; Alonso, 2020; Cherubini, 2020; Scott & Louie, 2020).

Digital equity was a common thread in the literature reviewed, for it intertwines with the themes (and sub-themes) of understanding rural poverty and returning to in-person learning. In consideration of rural poverty, numerous studies have concerned themselves with the lack of infrastructure supporting adequate broadband connectivity (Bansak & Starr, 2021; Cahoon et al., 2021; Frank et al., 2020; Looker & Bollman, 2020). Other scholars have emphasized the need for funding that provides students with their own educational technology (Nelson, 2007; Quezada et al., 2021). Conversely, Hall et al. (2020) suggested that, while providing students with technology is a necessary step forward, it is not enough to close the digital divide. Nonetheless, much of the literature, which has been previously reiterated, points to the need for improved government support for low-income rural communities and households, in both teaching and providing technological resources.

In this regard, some action has and is being taken in NS: The Internet for Nova Scotia Initiative promises to deliver internet to 87,000 homes and businesses, having completed 41,000 of the total since January 2021 (Office of the Auditor General of Nova Scotia, 2021). Additionally, the

Nova Scotia Education Minister announced in the fall of 2020 that $21.5 million would be invested into supplying schools with Chromebooks, as well as upgrades to Wi-Fi servers and routers, across the province (Nova Scotia Department of Education and Early Childhood Development, 2020). However, though this may support low-income students as they return to in-person learning, the concern then becomes of access within the household, especially during emergency remote education. Accounting for those in low-income contexts, Starkey et al. (2021) noted the stark differences between rural and urban school pandemic responses, and saw academic advantages for high-income homes in urban environments, and disadvantages for low-income homes in rural environments, credited to each home's level of "tech" (p. 2). This concern has received much attention in educational research, and as we continue to navigate the aftermath of emergency remote education, numerous scholars have taken note of how this will likely be shown to have negatively impacted students' return to in-person delivery (Bansak & Starr, 2021; Cahoon et al., 2021; Cherubini, 2020; Fontichiaro & Stephens, 2021; Hall et al., 2020; Howard et al., 2021).

Concerns for returning to in-person learning

Given (in light of the recent pandemic) the newly emerging post-pandemic education, there exists little research exploring the impact of emergency remote education on students' return to in-person delivery. Scholars have made predictions about the adverse effects on students' academic achievements, as well as their social, emotional, and physical well-being. Explanations for the anticipated impact of emergency remote education have varied across the literature review. The bulk of studies, predictably, estimated that rural students of low-income status will have been negatively impacted, as academic gaps across students will have widened more than normal in the coming school years (Bacher-Hicks et al., 2021; Panther et al., 2021; Parolin, 2021). Bansak and Starr (2021) and Cahoon et al. (2021) predicted that parental involvement will be an important indicator of how severely students in low-income rural communities will have been affected by emergency remote education, concluding that the education level and socioeconomic status of parents / guardians will have dictated how able they were to support their child in completing online learning. Additional arguments have suggested that institutional support of teachers and technology-oriented professional development will tell of how students will have been impacted by emergency remote education (Kaden, 2020; Trust & Whalen, 2021). For example, when studying teachers' perceptions of both individual and institutional readiness to teach online, Howard et al. (2021) reported that teachers of low-income

communities had negative perceptions of how students received online learning, citing limited professional development and time to prepare and transition as the cause. Starkey et al. (2021) reported mixed levels (ranging from low to high) of teachers' perceived preparedness to shift to online learning, with professional and institutional support identified at all levels, suggesting stark differences between rural and urban school leaders' responses to those in low-income / low-tech homes.

Adding greater complexity to the theme of teacher preparedness is the idea of supporting students of adverse experiences during times of crisis. Various scholars have drawn attention to the lack of professional development aimed at teaching to racialized and low-income students in at-home learning settings, suggesting that teachers were insensitive to the disadvantages these students faced when learning from home (Cherubini, 2020; Literat, 2021; Kast et al., 2021; Quezada et al., 2021; Trust & Whalen, 2021; Van Nuland et al., 2020). Additionally, Grooms and Childs (2021) reported participants felt as though the decision-making and policies surrounding emergency remote education did not meet the needs of racialized and low-income students.

Regardless of race, access to adequate internet and educational technology were more commonly cited explanations for the anticipated academic disadvantages of students who experience rural poverty. According to Kaden (2020), a large majority of students in remote communities could not be reached via email or phone, and, of these students, some were learners who were experiencing homelessness and/or poverty. As such, teachers were unable to assess and monitor their learning, making preparations for the return to in-person delivery that much more challenging. Similarly, Bacher-Hicks et al. (2021), Grooms and Childs (2021), and Starkey et al. (2021) indicated that, though the demand for online learning materials had increased in both low- and high-income households, the demand was significantly greater in high-income homes, which will inevitably contribute to the growing academic gap.

Post-pandemic teacher education and personal development

Some scholars have credited the pandemic as an "eye-opening" experience for pre-service teachers, with certain responses to teacher education programs being cited as "innovation" (Ellis et al., 2020, p. 559). According to Panther et al. (2021), pre-service teachers felt that emergency remote education during practicum evolved their understandings of (a) the purpose of education, (b) beliefs about education, (c) curriculum, (d) instruction, (e) assessment, and (f) classroom community (p. 8). Additionally, the pandemic exposed teacher candidates to the huge

amount of emotional work that is required of teachers (Alonso, 2020; Kaden, 2020), and amplified the aspects of education systems that help or hinder learning.

In response to the pandemic, scholars suggested that many pre-existing recommendations to teacher education programs are more crucial now in the aftermath of emergency remote education in rural communities than ever before. The most common of these suggestions was the inclusion of rural-specific pedagogy and professional development in teacher education programs (Fontichiaro & Stephens, 2021; Kaden, 2020; Peterson et al., 2018; Gereluk et al., 2020; Murphy et al., 2020; Danyluk et al., 2020), with some studies pointing to the need for professional development on digital literacy in rural contexts (Alonso, 2020; Cherubini, 2020; Ellis et al., 2020). Hall et al. (2020) made recommendations for teacher education programs to adopt training in digital literacy for pre-service teachers to actively work toward closing the digital divide amongst students; the same recommendations were made years prior by Dolan (2016) while investigating the disconnect between students' access to technology at home and their access and use of technology in school. Goodnough and Mulcahy (2011) and Hellsten et al. (2011) have argued for the inclusion of rural-specific pedagogy as a way to better prepare pre-service teachers for the diverse experiences in low-income rural communities. Correspondingly, Kast et al. (2021) and Quezada et al. (2021) understood that the pandemic would exacerbate the number of students who experience poverty, and thus they have made similar recommendations for adopting pedagogies that reflect the specific social and cultural experiences of these communities considering the pandemic.

Though most of the literature reviewed reported negative perceptions of emergency remote education, some research has suggested that this format may contain some benefits for students who experience poverty, such as flexible schedules to accommodate those who work to support their families and newfound independence in schoolwork (Bansak & Starr, 2021). However, most studies, even those in which these positives were discussed, have also pointed out that online learning is only successful when teachers and institutions have adequate preparation time, a crucial element which was not available to them during the pandemic (Bacher-Hicks et al., 2021; Fontichiaro & Stephens, 2021; Howard et al., 2021; Literat, 2021; Trust & Whalen, 2021). As suggested by Kaden (2020), "new teachers must be prepared in their teacher education programs to serve the rapidly growing number of online students and have the pedagogy skills for the blended learning models of the future" (p. 12), yet online learning cannot be seen as the sole remedy to equity concerns in

accessing education. As such, a commonality amongst the reviewed literature was the call for institutions to develop emergency response plans to prepare future education systems if something of COVID-19's magnitude happens again.

IMPLICATIONS FOR FUTURE PRACTICE & RESEARCH

With the consequences of the COVID-19 pandemic still unfolding, we cannot say for certain what impact emergency remote education will have on the development of teacher identities in rural communities, nor can we confidently speak to its long-term effects on students who experience rural poverty. However, given the brief contemporary contextualization of rural poverty and education we have offered in this article, based on our review, we suggest that the future of rural education is reliant on the study of the pandemic in the context of teacher education and policy. As we navigate a post-COVID-19 world, we believe rural school systems, educators (both present and future), stakeholders in teacher education, and education policymakers should value this type of research, and we present this review as a recognition of the areas that we believe call for further inquiry. It is with this understanding that we present the following implications for future practice and research.

Implications for practice

The pandemic has illuminated various avenues that concern future practice. The following list identifies some (research supported) implications for practice that may help remedy the impact of emergency remote education for students in low-income rural communities:

1. Improvements to welfare systems and rural infrastructure (Cherubini, 2020; Frank et al., 2020; Kaden, 2020; Parolin, 2021; Starkey et al., 2021; Van Nuland et al., 2020; Scott & Louie, 2020; Looker & Bollman, 2020).

2. Building of enduring professional communities online and/or in schools for rural educators (Grooms & Childs, 2021; Hellsten et al., 2011; Hill et al., 2020; Quinn, 2022; Murphy et al., 2020; Gereluk et al., 2020).

3. Greater integration of digital literacy and awareness of digital equity in teacher education programs (Ellis et al., 2020; Hall et al., 2020; Quinn, 2022).

4. Improvements to teacher education and professional development in the pedagogy of care for at-risk students in times of crises (Fontichiaro & Stephens, 2021; Grooms & Childs, 2021; Literat, 2021; Trust & Whalen, 2021).

5. Implementing emergency response plans to prevent future disruptions in learning (Bacher-Hicks et al., 2021; Panther et al., 2021).

Implications for research

The completion of this review highlighted gaps in research across several areas. More specifically, these gaps pointed to the need for a post-pandemic investigation into teacher education, including their integration of rural pedagogy. Substantial, ongoing research is needed to fully understand the complexities of post-pandemic rural education.

Rural pedagogy in teacher education

Suggestions for the improvement of rural education depend on the implementation of rural pedagogy in teacher education programs. The recommendations varied between studies, with some suggesting rural practicum placements (Goodnough & Mulcahy, 2011; Murphy et al., 2020), or specific courses on rural education (Hellsten et al., 2011; Peterson et al., 2018), both of which have the primary goal of improving teacher education's ability to reflect diverse classrooms. While these studies are, most certainly, valuable to our understanding of the cultivation of rural teacher identities in teacher education programs, an updated investigation is overdue. Additionally, given the infrequency of longitudinal studies on this topic of research, there is a need for further investigation of such recommendations and the results they yield. It has been noted (Ellis et al., 2020) that the pandemic will undoubtedly impact teacher education, as the response to emergency remote education resulted in a perceived overall improvement to the quality of teacher education, including online instruction and the development of placements at virtual schools. However, what this means for the inclusion of rural pedagogy in teacher education is undetermined, which, in part, may be explained by the little research done on this topic pre-pandemic.

Pandemic-informed teacher education

A considerable gap in current literature is an investigation of how to equip pre-service teachers to combat certain challenges in rural education that have since evolved in the face of the pandemic. Though there is a present surge in the literature on post-pandemic professional development for in-

service teachers to include topics such as digital literacy and rural education, and their intersections with poverty and race (Cherubini, 2020; Kast et al., 2021; Panther et al., 2021; Quezada et al., 2021), with the absence of similar research done for pre-service teachers, little is known of what can be accomplished in teacher education programs should the same teachings be offered. Indeed, present educators will play an important role in our approach to post-pandemic rural education; however, it is of equal importance that teacher education programs enhance their instruction of rural pedagogy to include the consequences of the pandemic on rural poverty in the context of education. As such, deepening scholarship on this perspective will prove to be formative for post-pandemic rural education.

CONCLUDING COMMENTS

It is evident in the literature reviewed that not only has the pandemic illuminated discrepancies in education, but it has exacerbated the many inequalities present. Given the developing nature of emergency remote education's outcomes, numerous avenues exist for further research. While this review does not offer explicit direction for remedying the pandemic's impact on low-income rural communities, we believe it has highlighted a gap in understanding the potential of rural-specific instruction in teacher education to benefit post-pandemic education in said communities. As such, we have attempted to outline the reoccurring trends (and sub-trends) in the literature, of which many intersect with one another (e.g., conditions where race, home environment, and digital equity open dialogue for improvements to public infrastructure), and we believe that this may be cause for deeper investigation of emergency remote education in rural settings. As well, we believe that the study of in-service teachers' experiences with emergency remote education in rural settings may be telling of what can be done in teacher education post-pandemic. Fundamentally, rural school systems — including pre- and in-service teachers, administrators, stakeholders in teacher education, and education policymakers — need to understand the severity of the living and learning conditions for low-income rural students in face of the pandemic and its aftermath. This review has attempted to draw attention to these experiences to support the development of future teacher education programs in integrating pandemic-informed rural pedagogy.

REFERENCES

Alonso, L. (2020). Teacher education in the borderlands: Examining the intersections of being a teacher candidate and essential worker in the age of COVID-19. *Issues in Teacher Education*, *29*(1/2), 35–44. https://www.itejournal.org/wp-content/pdfs-issues/fall-2020/07alonso.pdf

Bacher-Hicks, A., Goodman, J., & Mulhern, C. (2021). Inequality in household adaptation to schooling shocks: COVID-induced online learning engagement in real time. *Journal of Public Economics*, *193*(2021), Article 104345. https://doi.org/10.1016/j.jpubeco.2020.104345

Bansak, C., & Starr, M. (2021). COVID-19 shocks to education supply: How 200,000 U.S. households dealt with the sudden shift to distance learning. *Review of Economics of the Household*, *19*(1), 63–90. https://doi.org/10.1007/s11150-020-09540-9

Bennett, P. W. (2013). *The Last Stand: Schools, communities and the future of rural Nova Scotia*. Fernwood Publishing.

Bollman, R. D. (2021). COVID-19 and the differential impacts on the rural and urban economies. *The Journal of Rural and Community Development*, *16*(4), 246–298. https://journals.brandonu.ca/jrcd/article/view/2063

Boylan, C., & McSwan, D. (1998). Long-staying rural teachers: Who are they? *Australia Journal of Education*, *42*(1), 49–65. https://doi.org/10.1177/000494419804200104

Cahoon, A., McGill, S., & Simms, V. (2021). Understanding home education in the context of COVID-19 lockdown. *Irish Educational Studies*, *40*(2), 443–455. https://doi.org/10.1080/03323315.2021.1921010

Cherubini, L. (2020). Education in the post-pandemic era: Indigenous children and youth. *International Indigenous Policy Journal*, *11*(3), Article 10679. https://doi.org/10.18584/iipj.2020.11.3.10679

Corbett, M. (2014). Toward a geography of rural education in Canada. *Canadian Journal of Education*, *37*(3). https://journals.sfu.ca/cje/index.php/cje-rce/article/view/1412

Corbett, M. (2020). Place-based education: A critical appraisal from a rural perspective. In M. Corbett & D. Gereluk (Eds.), *Rural teacher education: Connecting land and people* (pp. 279–298). Springer.

Corbett, M., & Gereluk, D. (2020). Introduction: Why rural matters in Canadian education. In M. Corbett & D. Gereluk (Eds.), *Rural teacher education: Connecting land and people* (pp. 3–17). Springer.

Danyluk, P. J., Burns, A., Scott, D. (2020). Becoming a teacher in a rural or remote community: The experiences of educational assistants. In M. Corbett & D. Gereluk (Eds.), *Rural teacher education: Connecting land and people* (pp. 183–202). Springer.

Dolan, J. (2016). Splicing the divide: A review of research on the evolving digital divide among K–12 students. *Journal of Research on Technology in Education*, *48*(1), 16–37. https://doi.org/10.1080/15391523.2015.1103147

Ellis, V., Steadman, S., & Mao, Q. (2020). 'Come to a screeching halt': Can change in teacher education during the COVID-19 pandemic be seen as innovation? *European Journal of Teacher Education*, *43*(4), 559–572. https://doi.org/10.1080/02619768.2020.1821186

Fontichiaro, K., & Stephens, W. S. (2021). Blurring the boundaries between home and school: How videoconference-based schooling places American education's cultural values at risk during COVID-19. *Journal of Children and Media*, *15*(1), 96–100. https://doi.org/10.1080/17482798.2020.1860101

Frank, L., Fisher, L., Saulnier, C. (2020). *2020 report card on child and family poverty in Nova Scotia: Willful neglect?* Canadian Centre for Policy Alternatives | Nova Scotia. https://www.policyalternatives.ca/wp-content/uploads/attachments/ Childpovertyreportcard2020.pdf

Gereluk, D., Dressler, R., Eaton, S. E., & Becker, S. (2020). "Growing our own teachers": Rural individuals becoming certified teachers. In M. Corbett & D. Gereluk (Eds.), *Rural teacher education: Connecting land and people* (pp. 137–154). Springer.

Goodnough, K., & Mulcahy, D. (2011). Developing teacher candidate identity in the context of a rural internship. *Teaching Education*, *22*(2), 199–216. https://doi.org/10.1080/ 10476210.2010.539680

Grooms, A. A., & Childs, J. (2021). "We need to do better by kids": Changing routines in U.S. schools in response to COVID-19 school closures. *Journal of Education for Students Placed at Risk*, *26*(2), 135–156. https://doi.org/10.1080/10824669.2021.1906251

Hall, J., Roman, C., Jovel-Arias, C., & Young, C. (2020). Pre-service teachers examine digital equity amidst schools' COVID-19 responses. *Journal of Technology and Teacher Education*, *28*(2), 435–442. https://doi.org/10.70725/469279rnlzrm

Hellsten, L. M., McIntyre, L. J., & Prytula, M. P. (2011). Teaching in rural Saskatchewan: First year teachers identify challenges and make recommendations. *Rural Educator*, *32*(3), 11–21.

Hill, C., Rosehart, P., St. Helene, J., & Sadhra, S. (2020). What kind of educator does the world need today? Reimagining teacher education in post-pandemic Canada. *Journal of Education for Teaching*, *46*(4), 565–575. https://doi.org/10.1080/02607476.2020.1797439

Howard, S. K., Tondeur, J., Siddiq, F., & Scherer, R. (2021). Ready, set, go! Profiling teachers' readiness for online learning in secondary education. *Technology, Pedagogy and Education*, *30*(1), 141–158. https://doi.org/10.1080/1475939X.2020.1839543

Kaden, U. (2020). COVID-19 school closure-related changes to the professional life of a K–12 teacher. *Education Sciences*, *10*(6), Article 165. https://doi.org/10.3390/educsci10060165

Kast, J., Linder, K.-T., Gutschik, A., & Schwab, S. (2021). Austrian teachers' attitudes and self-efficacy beliefs regarding at-risk students during home learning due to COVID-19. *European Journal of Special Needs Education*, *36*(1), 114–126. https://doi.org/10.1080/08856257.2021.1872849

Literat, I. (2021). "Teachers act like we're robots": TikTok as a window into youth experiences of online learning during COVID-19. *AREA Open*, *7*(1). https://doi.org/10.1177/2332858421995537

Looker, E. D., & Bollman, R. D. (2020). Setting the stage: Overview of data on teachers and students in rural and urban Canada. In M. Corbett & D. Gereluk (Eds.), *Rural teacher education: Connecting land and people* (pp. 21–74). Springer.

Murphy, M. S., Driedger-Enns, L., & Huber, J. (2020). Rural schools as sites for ongoing teacher education: Co-making relational inquiry spaces between a principal and a beginning teacher. In M. Corbett & D. Gereluk (Eds.), *Rural teacher education: Connecting land and people* (pp. 171–183). Springer.

Nelson, M. K. (2007). Ongoing challenges in the understanding of rural poverty. *Journal of Poverty*, *10*(4), 89–108. https://doi.org/10.1300/J134v10n04_05

Nova Scotia Department of Education and Early Childhood Development. (2020, November 23). *New computers, technology for students* [Press release]. https://news.novascotia.ca/en/ 2020/11/23/new-computers-technology-students

Office of the Auditor General of Nova Scotia. (2021). *Report of the auditor general to the Nova Scotia house of assembly: Internet for Nova Scotia.* https://oag-ns.ca/sites/default/files/publications/2021InternetFullWeb.pdf

Panther, L., Allee-Herndon, K. A., Perrotta, K., & Cannon, S. (2021). I can tell you stories: Teacher education during educational disruption. *The Teacher Educator*, *56*(3), 327–345. https://doi.org/10.1080/08878730.2021.1918302

Parker, D. (2017). The impact of professional development on poverty, schooling, and literacy practices: Teacher narratives and reformation of mindset. *Cogent Education*, *4*(1), Article 1279381. https://doi.org/10.1080/2331186X.2017.1279381

Parolin, Z. (2021). What the COVID-19 pandemic reveals about racial differences in child welfare and child well-being: An introduction to the special issue. *Race and Social Problems*, *13*, 1–5. https://doi.org/10.1007/s12552-021-09319-2

Peterson, S. S., McIntyre, L., & Heppner, D. (2018). Northern rural and Indigenous teachers' experiences and perceptions of rural teaching and teacher education. *Journal of Teacher Education and Educators*, *7*(3), 189–205.

Power, T., Wilson, D., Best, O., Brockie, T., Bourque-Bearskin, L., Millender, E., & Lowe, J. (2020). COVID-19 and Indigenous Peoples: An imperative for action. *Journal of Clinical Nursing*, *29*(15/16), 2737–2741. https://doi.org/10.1111/jocn.15320

Quezada, R. L., Buczynski, S., Medina, R. A., Stolz, S., Fabionar, J., & Jez, R. (2021). Editors' introduction: Envisioning teacher education. *Teacher Education Quarterly*, *48*(2), 3–6. https://www.jstor.org/stable/27094726

Quinn, F., Charteris, J., Adlington, R., Rizk, N., Fletcher, P., & Parkes, M. (2022). The potential of online technologies in meeting PLD needs of rural teachers. *Asia-Pacific Journal of Teacher Education*, *50*(1), 69–83. https://doi.org/10.1080/1359866X.2020.1849538

Schiff, R., Buccieri, K., Schiff, J. W., Kauppi, C., & Riva, M. (2020). COVID-19 and pandemic planning in the context of rural and remote homelessness. *Canadian Journal of Public Health*, *111*(6), 967–970. https://doi.org/10.17269/s41997-020-00415-1

Scott, D., & Louie, D. (2020). Reconsidering rural education in the light of Canada's Indigenous reality. In M. Corbett & D. Gereluk (Eds.), *Rural teacher education: Connecting land and people* (pp. 113–133). Springer.

Smith, C. W., & Peller, P. (2020). "You can't get there from here": Mapping access to Canada's teacher education programs. In M. Corbett & D. Gereluk (Eds.), *Rural teacher education: Connecting land and people* (pp. 75–98). Springer.

Starkey, L., Shonfeld, M., Prestridge, S., & Cervera, M. G. (2021). Special issue: COVID-19 and the role of technology and pedagogy on school education during a pandemic. *Technology, Pedagogy and Education*, *30*(1), 1–5. https://doi.org/10.1080/1475939X.2021.1866838

Stelmach, B. (2020). Rural, secondary school parents' discourses about feeling in community in their children's schools: Insights to shape teachers' and principals' questions. In M. Corbett & D. Gereluk (Eds.), *Rural teacher education: Connecting land and people* (pp. 203–224). Springer.

Trust, T., & Whalen, J. (2021). Emergency remote teaching with technology during the COVID-19 pandemic: Using the whole teacher lens to examine educator's experiences and insights. *Educational Media International*, *58*(2), 145–160. https://doi.org/10.1080/09523987.2021.1930479

Van Nuland, S., Mandzuk, D., Tucker Petrick, K., & Cooper, T. (2020). COVID-19 and its effects on teacher education in Ontario: A complex adaptive systems perspective. *Journal of Education for Teaching*, *46*(4), 442–451. https://doi.org/10.1080/02607476.2020.1803050

MEAGAN KETTLEY is a practicing teacher with over 4 years of classroom experience. She graduated from St. Francis Xavier University, Nova Scotia, in 2022 with the University Gold Medal for Bachelor of Education, where she assisted several education research projects. Her research interests focus on early career teachers and equity studies in education, with a particular passion for reading development and literacy. Meagan currently teaches 8th-grade language arts at Harold Peterson Middle School in Oromocto, New Brunswick. meagan.kettley@nbed.nb.ca

JENNIFER MITTON, PhD, is a professor of secondary literacy and qualitative research methods in the Faculty of Education at St. Francis Xavier University in Nova Scotia. Prior to university teaching, she taught in secondary schools in New Brunswick, Nova Scotia, and Turkey. Her research interests include adolescent literacies, pre-service teachers and early career teachers, and teacher pedagogy related to culturally responsive beliefs and instruction. jmitton@stfx.ca

MEAGAN KETTLEY est enseignante et compte plus de quatre ans d'expérience en classe. Elle a obtenu en 2022 un baccalauréat en éducation à l'Université St Francis Xavier, en Nouvelle-Écosse, pour lequel elle a reçu la médaille d'or de l'université. Durant ses études, elle a participé à plusieurs projets de recherche en éducation. Ses intérêts de recherche portent sur les personnes enseignantes en début de carrière ainsi que sur les études en équité en éducation, avec une passion particulière pour le développement de la lecture et de la littératie. Meagan enseigne présentement les arts langagiers en 8e année à la « Harold Peterson Middle School, » à Oromocto, au Nouveau-Brunswick. meagan.kettley@nbed.nb.ca

JENNIFER MITTON, PhD, est professeure en littératie secondaire et en méthodologie de recherche qualitative à la Faculté d'éducation de l'Université St Francis Xavier, en Nouvelle-Écosse. Avant d'enseigner à l'université, elle a enseigné dans des écoles secondaires au Nouveau-Brunswick, en Nouvelle-Écosse et en Turquie. Ses intérêts de recherche portent sur la littératie chez les adolescents, les personnes enseignantes en formation et en début de carrière, ainsi que sur la pédagogie enseignante liée aux croyances et aux pratiques culturellement pertinentes. jmitton@stfx.ca