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A Genesis of Remote Teaching in Swedish Rural Compulsory Schooling

Josef Siljebo
Umeå University, Department of Education.
josef.siljebo@umu.se

Fanny Pettersson
Umeå University, Department of Education.
fanny.pettersson@umu.se

Björn Norlin
Umeå University, Department of Education.
bjorn.norlin@umu.se

Abstract

Remote teaching in Sweden has emerged as a response to the persistent challenges of rural education, including sparse populations, urbanisation, declining birthrates, and long travel distances. This study investigates the historical genesis of remote teaching in northern Sweden, particularly in small rural schools, where digital technologies have been used in K-12 education. Through a microhistory approach, we examine early developments in digital education, drawing from interviews with key stakeholders involved in school development and governance from the 1980s to 2010. The findings suggest that the integration of digital technologies in rural Swedish education was driven by both necessity and innovation, as schools sought solutions to sustain education in sparsely populated areas. The study contributes a historically contextualised perspective on remote teaching, emphasising the long-term challenges of rural schooling and the role of digital technologies in addressing these issues. By analysing the early adoption of digital education in Swedish rural municipalities, we provide insights into the evolution of remote teaching and its implications for future educational practices.

Keywords: *remote teaching; rural education, digitalisation; microhistory; K-12 schooling; Sweden*

Introduction

Every educational practice has a history and to understand the present opportunities and challenges and develop them towards a future, history plays a key role. This study seeks to understand one genesis of the teaching and learning practice called remote teaching in Sweden. In essence, remote teaching is a form of teaching and learning in K-12 (kindergarten to upper secondary schools) schooling, using computers and where teacher and pupils are separated in space (i.e., teaching online) but not time (i.e., synchronously; Siljebo & Pettersson, 2022; Skog et al., 2024). We argue that one genesis of remote teaching is rooted in rural education in northern Sweden's inland, with its relatively extreme challenges of sparse population, urbanisation, decreasing birthrates, and large travel distances (Billmayer et al., 2020; Sundvall, 2024). In this text, we utilise the notion *persistent challenges* to encapsulate both the specific challenges of rural schooling and the fact that these challenges are long-term and, as such, 'historical'.

Remote teaching and learning in Sweden may be compared to international research concerning distance/online/virtual/blended schooling where digital technologies are used with the purpose

of facilitating teaching and learning across space and time (Caprara & Caprara, 2022; Zhang et al., 2023). Concerning rural schooling practices worldwide, schools have utilised digital technologies to bridge distance for a long time (e.g., Barbour, 2018; Broadley, 2012; Cavanaugh et al., 2009; Trindad & Broadley, 2008; Whalley & Barbour, 2020), and before that other media such as radio and television (Barbour, 2021; Clark, 2013). The approach of this study is to 'dig' deeper regarding Swedish remote teaching's history in rural educational practices, thereby contributing with historically contextualised knowledge concerning rural schooling (Zhang et al., 2023).

Our study's educational practices are in northern Sweden's rural inland. Schools in these areas are considered to be small and rural in terms of:

> *sparse population (less than 7 inhabitants per square kilometre and less than 20 000 inhabitants in the municipality), low number of students (up to 55), long distance to municipality centre (on average 45 minutes by car), financial constraints and few teachers (on average 3-7 teachers).* (Ström et al., 2024, p. 110; see also Pettersson, 2017)

We interviewed people that held central positions concerning school development and governing as early as in the 1980s, yet most of them worked during the period 1990 to 2010, in three rural municipalities. We also interviewed one development manager, active between 2000-2010, in a university-school collaboration centre for the county (a constellation of neighbouring municipalities) of the three rural municipalities. This rural county context is particularly relevant, we argue, since the schools in the municipalities may have 'pioneered' the use of digital technologies for teaching and learning because of the challenges of rural schooling (cf. Stevens, 1995).

The aim of this study is to contribute within an historically contextualised understanding of the genesis of remote teaching in Sweden, where we suggest that the challenges of rural schooling play a central role. We use an approach inspired by microhistory (e.g. Magnússon & Szijártó, 2013), where we search for the beginning of remote teaching through the small-scale historical accounts of people. The research questions guiding our work were:

> *(RQ1) what are the persistent challenges of rural schooling for the municipalities and how do they connect to broader technological and governing trends?*
>
> *(RQ2) how and when did schools in the municipality start using digital technologies for teaching and learning in K-12 schools?*

Approaching Previous Research

In a recent computational review of global research literature of what they name rural-digital relations, Zhang et al. (2023) discuss that much of the literature reviewed (459 articles between 2010-2021) share a common problematisation of 'the rural' in terms of deficiencies or a challenge to overcome via digital technologies. This is an important, stage-setting issue for our study that needs to be addressed explicitly. Our approach to persistent challenges is as contextual challenges of, for example, rural geographies that entail concrete issues for people organising schooling to resolve. However, our position is, first, that 'challenges' in rural contexts, as in urban contexts, hold potential for novel development by people. Second, education in rural contexts is as important for society as in other contexts. Lastly, studies on rural schooling seldom explicitly attempt an historical perspective at the intersection of such challenges and digital technologies.

In the computational review, the authors identify ten topics, where 'education and training' is one such topic (Zhang et al., 2023) and in their analysis suggest that key findings of research have been marginalisation and inequalities of rural schools compared to other contexts. In their subsequent qualitative analysis of the Nordic region, none of the articles are from educational research, and the authors say that the Nordic research they found positions the rural in terms of "*recipients*" of digital practice rather than being a shaper of digital relations (Zhang et al., 2023, p.

9). In another research review (Fargas-Malet & Bagley, 2022) of literature on 'small rural schools' in Europe between 2000-2020, the authors found three articles (one from Italy, two from Finland) that specifically focused on digital technology in rural schools. These studies investigated issues concerning the use of specific models and technologies for teaching and possibilities and challenges related to their use for the teachers.

At this initial stage of reviewing research, it seems clear that the aim of this study in the international context of research on rural education and digital technologies is (a) positioned in themes/topics where we know relatively little, and (b) through our approach of people in rural schools as possible innovators can contribute to research that does not necessarily construct people in rural schools as recipients of digitalisation and thus marginalising them. In the following review, we will focus specifically on what we can say that we already know about the history of 'educational technologies' in rural schooling.

An Historical Perspective

In an international context, early attempts of distance education date back to the early 1900s in the form of correspondence schools to serve rural students, especially in rural areas of the United States, New Zealand, Canada, and Australia (Barbour & Wenmonth, 2024; Cunningham, 1931; Saettler, 2004; Wagner & Jaquiery, 1995). During the 1920s, the radio was used, which was then replaced by telephone systems and educational television during the 1930s (Rumble, 1989). During the 1960s, distance education became more widespread and more advanced educational satellites were developed that could provide education to students in sparsely populated areas to a greater extent. The first online-based attempts at distance learning came in the early 1990s with the first virtual schools in Australia, New Zealand, and the United States (Barbour & Ferdig, 2011). In the early 2000s, video conferencing emerged as a key platform for facilitating connections between schools and educational clusters, enabling remote collaboration and communication (Barbour, 2018). In Europe, however, the number of virtual schools was comparatively small (Russell, 2006).

The first schools to offer students full-time online participation were the Virtual High School Global Consortium and the Florida Virtual School which started in the United States in 1997. In the United States, approximately 40,000 students were estimated to participate in distance education courses during the 2000–2001 school year, and between 2010–2011, these courses had increased to approximately four million and in the school year 2016–17 to approximately eight million students (Barbour, 2018). In the twenty-first century, the use and spread of distance education increased greatly also in Europe with examples from Austria, the Netherlands, and Finland (Russell, 2006). Similar developments are assumed to have taken place in Canada, Australia, and New Zealand (Clark, 2013).

A Swedish Perspective

Like many rural areas in Europe (see e.g., Fargas-Malet & Bagley, 2022), and particularly the other Nordic countries, the northern Swedish inland is characterised by a vast and sparsely populated geography; small municipalities with restricted economies; underdeveloped communications; and long distances between villages, houses, and schools. Historically seen, these geographic features have come to set the basic conditions for organising education, from early modern ecclesiastical work and up until very present-day school concerns (e.g., Norlin, 2025; Sjögren & Westberg, 2015; Westberg, 2022).

Due to these ground conditions and challenges a set of local practices has gradually evolved. These include routines for conducting ambulatory schooling (e.g. mobile schools and traveling teachers), housing children in boarding homes in school villages, the organisation of various means of transportation between schools and homes, and the adjustment of study periods in relation to family work-life (Pers et al., 2022; Sjögren & Westberg, 2015; Swedish Transport

Administration, 2003). One concrete example is the Swedish Sami School, which between 1913 and 1962 was a residential school for children of the reindeer-herding Sami population (Lindmark & Sundström, 2016; Svonni, 2023). Dealing with concerns relating to distance as well as learning how to be flexible have, in other words, become important traits in local school governing. It is also the case when it comes to utilising new technologies and adapting their use to fit local conditions.

Since the 1960s and the 1970s, urbanisation and school decline have been accelerating trends in the rural inlands. However, a parallel national development has been the extension of compulsory schooling and the introduction of new secondary school forms. Until the 1970s, access to teaching and learning for children and young people could be considered good in Sweden since schools were located where families lived. The accelerating urbanisation in the 1970s (Dahllöf, 1973) and the closure of 490 schools during 1990–2010 led to extensive discussions on the access to equal education for children, especially in rural areas (Pettersson, 2017). To enable rural-living children to attend secondary schooling and reduce the length of travel and school days, new practices for transport, temporary boarding, as well as teaching by letter and radio were developed (Sjögren & Westberg, 2015). Notably, Sweden, since the 1880s, has had relatively strong legal directives for mandatory schooling—1882 (six years), 1937 (seven years), 1950/1962 (nine years) and 2018 (10 years, if including the pre-school class) – compared to other nations, and even if exceptions have been and can be made, the main principle has always been a requirement on children's physical attendance in school buildings (see e.g., Berg, 2003).

The decades following World War II saw centralisation in the education sector, a trend that due to reforms in the 1980s and early 1990s would swing back towards a higher degree of local self-governing and, at the same time, an opening for marketisation and private school ownership (Lundahl et al., 2013; Román et al., 2015; Wennström, 2020). These reforms are today considered as having had a fundamental impact on the national school sector, and they also mark the start of the period of investigation of this study.

In the beginning of the 2000s, reports on small-scale interventions aimed to investigate the use of remote teaching started to spread (Häll et al., 2007; Hegerholm, 2007). The interventions were successful and in 2015 remote teaching was 'formalised' in the Education Act (i.e., synchronous teaching via digital technologies where the teacher is teaching remotely from one place to a brick-and-mortar classroom of students). As such, remote teaching became permitted and the teaching practice slowly started to spread on a national level (From et al., 2020; Hrastinski et al., 2023; Parfa Koskinen, 2020; Pettersson & Lindfors, 2024; Skog et al., 2024).

Considering the reviewed literature in this section, we hold that by following the historical development to the very present past, the microhistory approach of this study concerning one genesis of remote teaching can be seen as contributing to the field of rural schooling and its history in several ways. By using interviews, it exposes relations, arguments and voices that would otherwise be silent or very hard to grasp in historical archives. It links local school conditions and actors to global trends, traces continuities and disruptions in local school developments, and reveals translocal exchange in school governance. Overall, it is a study that points to the interrelation between the local and the global, i.e. how global trends (e.g. technological shifts) meet and alter rural localities *and* how the distinct conditions of rural life may alter global trends.

Methodology

As mentioned, the present article took inspiration from a microhistory and oral history-approach (Magnússon & Szijártó, 2013; Shopes, 2011). By interviewing a set of local actors involved in school planning and governance, it generated knowledge about how a small-scale rural context responded to, and interacted with, overarching national and global developments. This

approach, focusing on the everyday, its social relations, as well as the role of human agency, can be seen as important to create a bottom-up understanding of the area in question (i.e. a trademark of microhistory). The focus on oral history was, in turn, natural, as there were few other sources at hand to understand the processes this research was interested in. In this way the study also adds an important dimension to more traditional archival or policy studies.

Data for the study was collected in one inland region in northern Sweden consisting of three neighbouring municipalities. The area was 62,600 km^2 in size and had a population of approximately 47,772 people. The region was also characterised by small school units, long distances between schools, and lack of certified teachers. The municipalities we selected ranged from about 5,500 to 13,000 citizens and all of them have for many years been challenged by decreased birthrate due to increased urbanisation. The municipalities are referred to as M1-3, where M1 and M2 are smallest in terms of population and border Norway in the west, and M3 the 'largest' (13,000 citizens).

Sampling and Data Collection

Together with the dearth of knowledge concerning the genesis of remote teaching, the purpose of our study prompted us to collect data that provided insights into historical challenges and development in this area. Following our purpose, we were particularly interested in the work of people that held central positions concerning school governing and development. Consequently, we collected data from six people who have been active in schools from the 1980s and forward – more specifically, five informants from the three municipalities who held school leadership and governing positions and one informant from the University-county development collaborative unit at the time. This person had first-hand insight into development projects concerning remote teaching during the early 2000s. Before the interviews, historical documents from the development unit's projects were also read and visits to schools in the municipalities were made to get some familiarity with the contexts.

The interviews were held during the spring of 2024. The method used was in-depth interviews (Johnsson, 2001; Kvale & Brinkmann, 2009). This approach of asking questions was used to encourage deeper and more comprehensive answers during the interviews (Johnson, 2001; Kvale & Brinkmann, 2009). Respondents were for example asked to "*tell the story about how you experienced the time of leading development in times of…"* (cf. Shopes, 2011) and "*discuss challenges you have experienced in terms of equal access to education*". Respondents were also given examples from historical events during that time to help them recall.

Although data in this project were not considered to be sensitive in a strict legal sense, it directly or indirectly effected actors working in or with schools in local communities, where other people may be aware of the project. The research project was, therefore, strictly informed by the recommendations of the Swedish Research Council (2024). This meant that ethical research standards and guidelines were considered throughout the research process. Respondents were informed about the aim of the project, methods, and how data would be used and presented in the project.

Analysis

All interviews were recorded and transcribed, followed by a thematic analysis (Braun & Clarke, 2022). To organise and make sense of the data, the overall strategy of coding and categorising was used. This process was conducted collectively by the researchers of this article. Each interview was analysed separately and then combined to display and understand persistent challenges of rural schooling and why, how, and when schools in the municipality started to use digital technologies for teaching and learning. After listening to the data sources to produce an overall picture and potential patterns in the data material, the analysis proceeded in three steps. During the first step, segments, descriptions, and quotations of relevance to the aim of the study

were initially marked and discussed. During the second step, description and segments were further analysed and placed into themes of challenges and aspects of why how and when. These themes were also placed and related to each other on a historical timeline. In the third step, the analysis from all interviews were combined and compared to each other. During this step alternative themes were elaborated on, and others were merged.

Results

This section relates to the two research questions directly. First, the persistent challenges of schooling in the municipalities are reported, which brings forward the contextual conditions of schooling. Also, these contextualisations are elaborated on with examples from the informants. Second, the persistent challenges are related to why and how the schools started using digital technologies for teaching and learning. The section persistent challenges concerns conditions that have existed during the informants' time of work in the schools, and before that time.

Persistent Challenges

As mentioned earlier, we utilised the notion persistent challenges to encapsulate both the specific challenges of rural schooling and the fact that these challenges were long-term and as such 'historical'. In the interviews, informants were asked to reflect and give examples concerning challenges that had been relatively stable over time (i.e., population and small schools), and also challenges that were caused by possible 'significant events' whatever that may be (i.e., school governing).

Population. The challenges concerning population were (at least) twofold. The geographic areas are considered sparsely populated and have always been so. However, since the 1970s, particularly in the municipalities investigated, people have increasingly moved from these and their neighbouring inland municipalities to the coastal municipalities and principally to cities. This resulted in (1) low numbers of pupils enrolled in the schools, and (2) that school enrolments and local birthrates were in a decreasing trend. However, with the small number of students there could also be relatively large 'fluctuations', specifically in the extremely small schools described below. One informant, for example, said that "*in that village, where I have my cabin, there is a house that used to be a school. That school was one family; they had thirteen kids.*" As such, when pupils graduated small schools then this was a considerable change in student enrolment for the school, or an even more considerable change if the family moved.

Remote and (Extremely) Small Schools. Two of the municipalities are what can be called 'mountain municipalities'. They border Norway in the northwest and have a mountainous terrain appreciated by tourists yet have one central urban area to the southeast where most of the population was situated. Also, these two municipalities had schools both in the southeast and in the northwest. M1 had one school about 90 kilometres from the population centre, and one school about 100 kilometres from the population centre. M2 had one school about 200 kilometres from the population centre. In addition, some of these schools were extremely small, both in terms of pupil groups (e.g. around 10 pupils in total for the school for grades one - six) and in terms of teachers (one - two). These schools have remained through time because of the principle that schools ought to be where communities are even though they are small communities. Moreover, if they were closed, the distance that pupils would have to travel to the central area was simply too far and they would spend a good part of their day on the bus. This should be understood in relation to the regulations in Sweden where students in compulsory schools must be in the school buildings, not learning from home, during the school day.

However, although these extremely small schools were situated closer to the mountainous regions of the northwest of the municipalities, the pupils had to travel tens of kilometres to these schools. In other words, the remote and small schools were spread out with large distances within the municipality, and the pupils attending these schools were spread out with large

distances to these extremely small schools. Extremely small schools have existed throughout history to varying degrees in all three municipalities. Concerning these schools, what one informant expressed in terms of the fact that the "*timeframe of the school day is determined by the bus schedule*" did not seem like an over-exaggeration, rather a very concrete principle for organising schooling in these contexts. This may be the case generally concerning schooling, however, because of the sparse population the buses for some of the schools in this study had very few daily trips (e.g., one to school in the morning and one back home in the afternoon).

School Governing

While school governing as a persistent challenge may sound counterintuitive, here are two aspects considered. One, that although school governing may change over time, it will always be necessary in some way and controlled by the Swedish Government. Two, that in Sweden since 1991 municipalities (there are 292 municipalities in total today) are the principal providers of schooling, with *economic and school development responsibility*, which informants contextualised in detail, presented below. Municipalities are also judicially responsible for schools. Before 1992, these responsibilities were centralised, for example into county school boards and national agencies, and as such more directly governed by the Swedish Government.

Economic Responsibility. The economic responsibility for schooling arose via municipalisation which provided that schools be primarily funded through local tax revenue from the local population. There were also general state grants, yet these were, compared to the municipal financing, small (around sixteen percent). As such, while this gave municipalities the freedom to prioritise which schools they wanted to run, these municipalities with their sparse population and large distances had both little tax revenue and higher costs per pupil (e.g., bus transfers). As such, common for all the interviews was talk about school closure because of the few economic opportunities of the municipalities, and especially the near-traumatic effects that such closures were said to have on the small communities.

However, an interesting aspect of school closures was the experience from one of the informants concerning their work as a school leader, specifically concerning communication with parents from a small community threatened by school closure. This informant said that parents from small communities they interacted with, for example in town meetings during school closure processes, on the one hand expressed a shared outrage and worry concerning what closing the school would mean for the village. Yet, on the other hand, in private conversations with individual parents, some could express that they, in fact, were glad that the school was closing, which meant that their children could go to another, larger school. This, the informant said, was because some parents perceived that the small school was not a positive experience for their children, and such beliefs could not be expressed during town meetings for fear of sanctions from the community. Setting the issue of if the schools were 'positive' or not aside, such sanctions, according to the informant would be "*excluded from the village sewing group and the moose hunting team*". This exposed the many different and contradictory views that may exist simultaneously concerning a school within a small community, and particularly the pressures within the communities to say the 'right thing' rather than have an open debate to address different concerns. The same informant also said that considering small remote schools are never economically sound, in extreme cases economic reasons could be used to justify closures even if there were other causes behind it.

While much talk about economical responsibility via municipalisation concerned school closures of small remote schools, there were also, albeit few, opportunities. One example was the possibility to allocate resources between school forms freely. In M2 this meant that the upper secondary school (grades 10-12, after compulsory schooling) could be financed through compulsory school resources. This possibility related directly to the challenges concerning population: if young adults stayed in the municipality for their secondary school education (often

vocational education) the hope was that they would, to a larger degree, stay, settle, and have children in the municipality. Otherwise, the young adults would go to secondary school in neighbouring municipalities such as M3, or to the coastal cities and settle there instead. In other words, upper secondary schools in these municipalities can be seen as an important instrument to prevent 'youth drain' and improve the long-term survival of the municipality itself.

School Development Responsibility. Before the municipalisation, school development responsibility rested on the county boards and was governed by a national school development agency. However, with the municipalisation, this responsibility was transferred to the role of school principal. The informants that worked as principals during this time expressed that this was a substantial change in the role of a school leader.

One informant worked as a principal for extremely remote and small schools from the 1990s up to the 2010s and talked about the challenge of leading small teacher teams, as small as two. One example was what they described in terms of the risk of development stagnation because there were only two teachers and could for various reasons not work well together. Another informant, also working as a principal, expressed that the municipalisation entailed that the principal role became 'wedged' between municipal school board, teachers, and parents. The informant gave an example that "*when school closures have been discussed and there have been strong emotions, politicians are not sent out to the villages, we [school leaders] are sent out to take the hit*". This entails that the individual accountability of school leaders towards the communities increased considerably when school development is not possible.

Another aspect of school development that the municipalisation entailed, not least for school leaders, was those decisions for organising schools 'came closer'. In other words, the organisation of schools and schooling in the municipalities came to rest more on the individual principals to achieve. While this certainly meant a host of difficulties, it also enabled the possibilities (or perhaps need) to craft local solutions depending on the conditions and resources of each individual school. School politics also came closer, with the election of local municipal politicians and policy directed municipal – rather than county – school boards.

How and When?

This section concerns the second research question, when and how schools in the municipalities started using digital technologies for teaching in learning in K-12 schools. Two examples will be given.

The first is in M1 in the early 2000s. In one of the extremely small and remote schools, the surrounding mountainous terrain was appreciated by Italian tourists, which resulted in different jobs made available through tourism. This meant that older pupils in the school that could work after school hours had such jobs with Italian tourists. This also meant that these pupils wanted to learn Italian as a so-called 'free choice' school subject, a possibility from grade seven at the time, which would enable them to communicate with the tourists in their native language. As such, the school leader found a teacher of Italian and made it possible for the teaching to take place via computers, internet, and Skype (a computer program for video synchronous communication).

The second example was a joint development project between M1 and two neighbouring municipalities during 2004-2006. The participants from the municipalities were the principals and teachers of the extremely small and remote compulsory schools (two schools from M1 and one each for the other two municipalities). In this project, financed through the university-school collaboration centre for the county, a common problem description of the municipalities' schools was how to ensure teaching quality despite decreasing financing and pupil enrolment. Here digital technology was hoped to act as a lever to enable shared teaching resources and as a facilitator for collaboration between the municipalities.

The primary activity of the project where digital technologies were used for teaching was that the four schools were responsible for one class session where pupils and teachers from all four schools participated. The theme for the classes was 'local history' of each school's local community, and subjects covered were, for example, local Sami languages and traditional practices for extracting tar through burning pine trees. The evaluations of these classes were both positive in terms of pupils' engagement, and negative in terms of various issues related to digital technologies not working as intended (e.g., disconnections and poor sound quality).

These examples relate to the persistent challenges, specifically in extremely small and remote schools. While these schools are extreme in many regards concerning organising schooling, they can also be responsive to the local needs of the community and its pupils. The crafting of local solutions was made possible through the smallness and the responsibility of school development that rests on individual school leaders. The steady decline in population and consequently economic resources were not simply persistent challenges, they were also kernels of 'necessary innovations', as seems evident in the early use of digital technologies in compulsory schooling.

Concerning the 'when' question, the examples above suggest that a pivotal moment in time was during the early 2000s. The participants also talked about free formal adult education provided in the municipalities and the use of digital technology in these practices. Here, also, the early 2000s were indicated as a pivotal moment in time.

Discussion and Concluding Remarks

The aim of this study has been to contribute with an historically contextualised understanding of one genesis of remote teaching in Sweden. Considering the results, we believe that the contexts investigated via informants have been productive. The contextualisations have made visible the persistent challenges and related these to specific examples of why, how, and when schools in the municipalities started using digital technologies for teaching and learning. A reflection on the design of the study, and particularly concerning the selection of informants, is that asking people to remember several decades back in time is a considerable challenge. For example, we may ask what makes the informants remember the particular examples that they shared. In our view, considering that the people working in schools before the decentralisation of schools (i.e., during the 1980s in Sweden) had a high average age, it is timely to conduct further studies with them. This is also becoming the case for people active during the early years of computers in schools in general (i.e., during the late 1990s and early 2000s).

While many parts of the persistent challenges are relatable to the local contexts' geographic and demographic conditions, which have impacted schooling for as long as formal schooling has been organised (Pers et al., 2022; Sjögren & Westberg, 2015), the contextualised school governing that our respondents talked about relates to larger governing movements. Specifically, the decentralisation (municipalisation) of school governing, following neo-liberal ideals of marketisation via private school ownership and students' 'free school choice' (Lundahl et al., 2013; Wennström, 2020), are interesting. While municipalisation introduced economic constraints on schools via the local municipal taxation on the small populations, our informants who were school leaders also talked about the changes to the role of principal and the ability/necessity to craft innovative solutions. Such solutions included using digital technologies for remote teaching based on the local resources and needs. Another solution was to create the upper secondary school in M2 to counteract youth drain to M3. Such youth drain is at least partly fuelled through the market of schools that the free school choice entails.

We have found *one* genesis of remote teaching in Sweden, rather than *the* genesis. To the best of our knowledge, the other possible geneses have only been made public in project reports (Häll et al., 2007; Hegerholm, 2007). In the study's regional context today, remote teaching is (still) utilised to provide several different subjects in most inland municipalities, as well as in coastal

municipalities. To us, it is humbling to consider that remote teaching as a part of the larger social process of digitalisation in Swedish schools (From et al., 2020) had a beginning in the very concrete request of a few pupils to learn Italian to be able to communicate more personally with Italian tourists. However, reasonably, an important element here is also the general technological development of digital technologies during this time, specifically concerning (a) internet infrastructure and (b) accessibility/affordability of laptop computers/mobile technology. These two coincided during the early 2000s in Sweden. In the Introduction, we suggested that rural schools have pioneered the development of remote teaching and as such digitalisation as a larger process of change in society. Through our study, we can say that the school leaders and teachers working in these schools indeed had been early in their use of digital technology for teaching and learning in schools, actually aiming to teach subjects rather than more 'fragmented' teaching concerning how to use word processing programs which was common at the time. As such, through technological development and the hard-working people in schools, the persistent challenges in these contexts have been the kernel of development that dialectically 'works' as both the foundation for the development and the problem to develop past or at least alleviate (Broadley, 2012; Pettersson, 2017; Stevens, 1995; Trindad & Broadley, 2008). Also, we may say that when 'digitalisation' in schools is shaped through these contexts, it takes on a relatively concrete and 'unhyped' meaning (From et al., 2020).

Another interesting contextualisation to make is to place remote teaching in a broader context of educational technology, and to consider the context of educational technology beyond what is used in classrooms. For a long time different technologies (in a broad meaning of technology) such as bussing students and ambulatory schooling, boarding homes, instructional films and television, and telephones have been utilised (Pers et al., 2022; Rumble, 1989; Saettler, 2004; Sjögren & Westberg, 2015; Swedish Transport Administration, 2003). On this timescale, we can see that technological development and school governance interact. In our study, the municipalisation, while imposing severe challenges for schooling particularly for rural municipalities, also enabled certain developments to be made with, in some respects, greater freedom for school leaders to 'innovate' with digital technologies.

The contributions of this study to the international research on rural education are to the intersection of digital-rural relations generally, where contextualised understanding of schooling issues and educational research seems underrepresented and where much research approaches 'the rural' as a problem to be solved (Guenther et al., 2023; Zhang et al., 2023). In addition, this study contributes to international research of small rural schools where historical contextualisation of digitalisation in schools seem missing entirely (Fargas-Malet & Bagley, 2022). Considering the scarceness of similar studies, and given our results, it would be very interesting and important with future studies that take a larger scope and investigate and compare remote teaching geneses nationally and internationally while still maintaining contextualised persistent challenges in connection with general trends.

Through this study, conclusions can be drawn for policy makers. First, given that the persistent challenges will likely worsen (e.g., the national and international trend of decreasing birthrates), it is reasonable to assume that several of this study's persistent challenges will have to be engaged with by more schools in the future. As such, policy makers can certainly draw upon the experience and knowledge of people in these practices that have engaged with persistent challenges with novelty. Second, given the challenges of the study's municipalities and particularly the extremely small schools, it seems clear that the distribution of resources for schools cannot operate on the same principles for all schools. Pupils 'cost more' in sparsely populated areas given the persistent challenges and a specific distribution of resources to small schools in rural areas could ensure that the ingenuity of people in rural schools can contribute even more to schooling. Finally, as regards to the fields of rural history and history of education, the study contributes by bridging existing knowledge of historical conditions to contemporary

ongoing processes. With its microhistory and oral history approach it also gives important insights into local school governing from an individual perspective, i.e. the role of the individual in decision making and in negotiating policy into practice. Such knowledge is very hard to attain in traditional historical sources and requires interviews as the method.

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