DOI : 10.18843/rwjasc/v14i1/06
DOI URL : http://dx.doi.org/10.18843/rwjasc/v14i1/06

Perceptions of Parents and Teachers on the use of 4IR Technologies in Rural Schools of Rustenburg Local Municipality

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(**Received:** May 28, 2023; **Revised:** July 30, 2023 **Accepted:** September 28, 2023)

ABSTRACT

Purpose: The primary aim of this study is to explore the perceptions of parents and teachers on the use of the fourth industrial revolution (4IR) technologies in rural schools. **Methodology:** The study employed semi-structured face-to-face interviews to collect information from the participants. A total of 12 participants were purposively recruited for this study. The **findings** of the study are as follows: technologies such as WhatsApp, Facebook, tablets and cell phones were frequently used. The choice of the types of technologies used were heavily influenced by skills and knowledge obtained prior to the roll out of digital transformation, while economic and services delivery related factors also contributed. Furthermore, the study discovered that the use of these technologies is a challenge for both parents and teachers. Parents are confronted with the inability to be involved in their children' schoolwork owing to factors such as low literacy, poverty and unemployment. Teachers also have challenges in facilitating classes using these technologies due to the misuse of devices by learners, their inability to use these technologies, or poor connectivity and electrical power issues relating to load shedding. **Implications:** The findings suggest that the use of technology in schools could help improve education provided that necessitated conditions such as ICT training and equitable distribution of such resources are met. **Originality:** At the height of COVID 19 and the increased use of ICTs, the paper sought to examine the views of parents and teachers in South Africa.

Keywords*: Fourth industrial revolution, education, rurality, social change, digital transformation.*

INTRODUCTION:

Social change is an essential aspect of every human society; it can be due to factors such as the need for adaptation, political and economic reasons, social movements and consumerism, to mentions a few (Vollmer, 2013; Porta & Kriesi, 1999; Alwin & McCammon, 2003). Macionis (1996) characterizes social change in the following four distinctive ways; in the context of COVID-19 and digital transformation in schools:

1. The use of fourth industrial revolution (4IR) technologies in South African schools is prevalent, however, the rate at which these technologies are used varies greatly between urban and rural schools (Moloi & Mhlanga, 2021; Yende, 2021).
2. Adoption of 4IR technologies, particularly in schools located in rural areas, was unplanned (Bizcommunity, 2009).
3. Digital technologies in schools are a subject of controversy between two groups: The first group argues that digital technologies promote accessibility, helps prepare students for future employment, and results in economic growth (Kayembe, 2019; Moloi & Mhlanga, 2020; Mkhize & Davids, 2020).

The second group argues that digital devices are expensive, and are distractions in the classroom, and can harm the social and psychological development of learners, with the added risk of compromising privacy (Dube, 2020; Mhlanga, 2020; du Plessis, 2020; Chirinda et al., 2021).

4. Certain technologies are more important than others; for example, information and communication technologies (ICTs) are prioritized more than the use of other 4IR technologies in schools such as block chain, internet of things and the like.

The controversy surrounding the use of these technologies could be used to determine the social acceptability of digital or information and communication technologies, understand the perspectives from which they are viewed, and ultimately gain insight into people's perceptions. However, there is a paucity of research that explores people's perceptions on 4IR technologies in rural schools. Exploring these perceptions could also be useful in informing policy formulation, particularly for purposes of rural development, and in response to the challenges faced by rural schools. As such, this research seeks to explore the perceptions of parents and teachers on the use of 4IR technologies in rural schools. This format followed herein is an introduction and a literature review on 4IR technologies in schools, followed by methods of data collection and analysis, and ethical considerations. The discussion follows, and finally ends with a conclusion.

The following section discusses the impact of COVID-19 and the subsequent use of 4IR technologies in schools in different contexts, viewed from a local and a global perspective.

LITERATURE REVIEW:

COVID-19 and 4IR technologies in schools:

The outbreak of the Coronavirus pandemic forced many schools globally to get onto online learning platforms (Myck et al., 2020). Health regulations under national lockdown in these countries required that education be organized through online learning methods and channels. In Poland, for example, electronic media were used as a channel of communication between teachers and learners (Kochan, 2021; Kruszewska, et al., 2022). Participation required access to a computer or a similar device, and internet facilities at home. But due to inadequate infrastructure and housing conditions, negative online learning conditions prevailed. In 2018, 7.1% of households with learners had no access to a computer or device for internet. Shortage of computers or similar devices varied across households, according to their socio-economic conditions and their residential areas. The pandemic saw 1.6 million learners in rural areas experience challenges to access the internet and computer equipment (Tomczyk & Walker, 2021; Myck et al., 2020).

For a globally comparative perspective, Australia saw the Coronavirus pandemic impact on education equity. Hattie (2020) cited learners from well-off families faring much better than those from low-income households. Learners facing educational exclusion are those from out-of-home care, families with domestic violence, alcohol or drug abuse, and households where parents were jailed before the pandemic (Maher, 2014; Paredes et al., 2020). Learners that were homeless and/or disengaged from education also experienced significant challenges. COVID-19 created newly disadvantaged groups: including learners whose parents lost their jobs and schools that supported physically disabled learners that could not be transferred home (Brown et al., 2020). Various studies (Dhawan, 2020; Kundu, 2018; Tyagi & Malik, 2020; Jena, 2020) found teachers in India using virtual classrooms to facilitate teaching and learning through relevant tools (e.g., 'Zoom', 'Googlemeets', 'YouTube live' etc.) to make online lessons as effective as traditional classrooms. In contrast to Australia, not all Indian learners had the necessary resources and knowledge to participate in online learning; the result was that learners from low-income households suffered.

In Cambodia, online learning was uncommon, and its implementation resulted in several challenges (Heng & Sol, 2020). Although blended learning was introduced before the pandemic, only universities used it. The accelerated use of technologies in such schools, due to the COVID-19 pandemic, was to say the least, rather abrupt. It posed serious risks of a possible shutdown of schools, due to limited resources, including technology and human resources, particularly in remote areas. African education settings are diverse, due to different ethnicities, experiences, languages, social, geographic and socio-economic conditions. Its challenges are thus also diverse (Adarkwah, 2021). As the pandemic spread, many countries closed down schools much earlier than expected (Ozili, 2020). This made the method of conducting classroom lessons unviable and without an immediate means of replacing it. Radio and television were used to offer

educational programs in many countries. However, access to such offerings was therefore limited to those that owned such audio and visual devices (Mathevula & Uwizeyimana, 2014; Hennessy et al., 2015).
Countries across the globe relied on different methods to facilitate teaching and learning (Mbiydzenyuy, 2020; Mahaye, 2020). Ghana, Egypt, Botswana, Namibia, Zambia, Ethiopia and Tanzania distributed educational materials to students in the form of hard paper, and used technologies like Zoom, Facebook, WhatsApp and Moodle. Effective online learning was disrupted by access to infrastructure and technology, affordability and accessibility to connectivity and electricity, conducive learning environments, appropriate curriculum and learning material, and the lack of interaction among learners. South Africa's historical past relayed existing inequalities and a high rate of COVID19 infections. The closure of various levels of schools in the country affected approximately 13 million learners from various backgrounds. Closure occurred against the background of persistent educational inequalities and a long-standing educational crisis, where most learners attended under-resourced schools with poor infrastructure, ill-equipped teachers, low student attainment, and high dropout rates. School closures also resulted in an increased burden on parents, guardians and teachers, particularly in rural areas (Garbe et al, 2020).
The following section discusses the implications of COVID-19 and 4IR technologies in rural schools. In particular, it discusses the involvement of parents or guardians and teachers in online education and/or their participation in education during the COVID-19 pandemic (2020-2022) and beyond, in the era of digital transformation in South Africa.

Parental and teacher involvement in education:
Historically, closing schools has been one effective way to deal with virus outbreaks, including swine flu, MRSA and influenza (Garbe et al, 2020). COVID-19 was no different, as schools' closures sought to prevent spreading the coronavirus nationally. This ultimately affected the day-to-day activities of schools. This affected learners, teachers and parents (Lawrence & Fakuade, 2021; Daniels, 2020; Taylor, 2020; Mukuna & Aloka, 2020; Ahmed et al., 2020) because teaching and learning took place remotely, within the confines of each learner's home. Under such circumstances, many parents became pseudo teachers to their children, taking over supervision of learning and being responsible for providing the necessary material; including the provision of conducive learning environments, learning devices and other requirements (Pastori et al, 2021; Ribeiro et al., 2021). Borup et al. (2016) and Gonzalez (1997) concur, in seeing parental involvement in traditional schooling playing an important role in pupil achievements. As such, the same would be true for remote learning under COVID-19 and remote learning.
The abrupt change in modes of teaching and learning as such, presented new challenges to parents and teachers as various various authors assert (Daniels, 2020; Grobler, 2022: Mukuna & Aloka, 2020). For Hohlfeld et al. (2010), the economic resources of parents have an impact on their involvement in remote learning, to which Cluver et al. (2020) and du Plessis (2020) agree, in terms of its deep impact. During COVID-19, parents lost their sources of income, and many households suffered economically (Hunt et al., 2021). Beckman (2019) cites another factor that is likely to affect parental involvement during online learning i.e., a lack of interest to use technology. Selwyn et al. (2011) indicate that parents have mixed feelings due to such factors; some parents feel connected to their children's schoolwork, while others feel that the use of technology in schools is an additional burden. Scholars such as Mkhize & Davids (2021), Dube (2020), Chirinda et al. (2021) indicated that teachers had difficulties teaching with the use of technologies due to the following factors: high computer illiteracy particularly among old teachers, unavailable resources (e.g., devices, electricity and connectivity), and learners misuse such devices or have limited knowledge of how to operate them.
There is a limited understanding of parental involvement in the day-to-day schoolwork of children. Scholars (Black, 2009; Cavanaugh et al., 2009) thus call for more research, and this is particularly pertinent under the changed conditions of COVID-19. Parental involvement for Dube (2020) and Lawrence & Fakuade (2021) is of utmost importance to sustain online learning. This is because in many instances, particularly in remote areas, parents have to provide resources, such as data, devices and all forms of necessary support to facilitate this form of education. This is due to the fact that these schools are poor and cannot afford to allocate devices or data to every pupil. Hasler-Waters and Leong's (2014) study on virtual learning before the pandemic, found that parents took up the role of learning coaches in online settings. Others found links between academic performance and parental involvement.
This study, although not directly addressing parental involvement, explores perceptions of parents and teachers on the use of 4IR technologies in rural schools. Exploring such perceptions could help understand both the extent to which parents and teachers are involved, and address questions that relate

to the social acceptability of these technologies in rural communities, as well as attitudes toward the use of technologies in schools to facilitate teaching and learning, and their contextual understanding of 4IR. Although the Fourth Industrial Revolution is for "fusing technologies that blurs lines between physical, digital and biological spheres", it is important to state that the phenomenon is understood differently by different people in different contexts, due to global gaps in development and resources.

Iyamu & Roode (2012) further discuss Friedman's (2005) argument that perceptions about a similar phenomenon vary across a range of people within the same historical period and culture. Moreover, factors such as race, gender, occupation, class and disability also entail distinctive perceptual expertise. Powers et al., (1979), examined eyewitness accounts, and found that females and males noticed different things at the same crime scene. With regard to occupations, argued that people in different occupations possess different perceptual abilities. Bourdieu (1984) also argued that the position of one's social class is attended by perceptual schemas, which structure one's judgment of art, among other things. Consequently, such variations can help understand how social structures enable and restrict parental and teacher involvement, how perceptual variations based on different cultures, socio-economic status, level of education, gender, occupation, age and the like, all influence people's understanding and therefore their human agency too (Giddens, 1984). This will be further explored below in the section relating the theoretical background.

Theoretical background:

This paper uses Giddens' structuration theory as a basis to understand the social phenomenon under investigation. Such a theory seeks a 'third way' between objectivist approaches such as structuralism, functionalism, post-structuralism, and such theories that emphasize structure and the constraints imposed by structure on individual participants (Blunden, 2016), and the subjectivist approaches (e.g., phenomenology and hermeneutics), which view individual agents as essentially autonomous. For Giddens, these approaches (objectivist) take individual participants and their activity as sociological dopes and simpleton prisoners of ideologies. These discount the knowledgeability of social actors in social processes. Giddens also criticizes subjectivist approaches, where social processes or events are necessary in relation to the ongoing reproduction of the social system. Giddens proposes that knowledge forms the basis why social actors do what they do. At the center of Giddens' conception of knowledgeability is discursive and practical consciousness. Notable in Giddens' structuration theory is reflexivity, implying the following:

There is no mechanism of social organization or social reproduction identified by social analysts, which lay actors cannot also get to know about and actively incorporate into what they do (Giddens, 1984: 284).

This paper uses 'knowledgeability' (Giddens), to understand actors' decisions, and why such decisions are made. Knowledgeability means that social actors are the only subjects of social theory, the degree and mode in which the results of their action are a by-product of their motivations. Giddens adopts Vygotsky's (1934) view that social actors employ resources, allocative or authoritative, without necessarily being cognizant of their existence and restrictions.

RESEARCH DESIGN AND METHODOLOGY:

Perceptions of parents and teachers on the use of 4IR technologies in schools involve their understanding and interpretation of the phenomenon. This is equally the sum of their lived experiences, and therefore necessitates a qualitative methodology that is both exploratory and descriptive. Qualitative research entails the exploration of the real-life experiences of participants (Burns & Groove, 2001). This is the primary aim here, i.e., to explore perceptions of participants within a particular context, and consequently justifying this selection. For Burns and Groove (2001), an explorative design is used to gain new insights and expand knowledge within a particular area. As the literature review showed, technology usage in rural schools is relatively new, with limited research on 4IR and education. An explorative design in this regard would consequently yield undiscovered realities in the field. A descriptive design in this research will significantly contribute to directly study, analyse and describe the perceptions of the participants.

Participants and sampling:

This section discusses the characteristics of the participants, sampling technique, data collection, and analysis methods used in this study. Table 1 below outlines participants characteristics.

Table 1: Characteristics of participant

Total number of participants: 12	
Parents 7	
Teachers 5	
Employment status	
Employed	**: 6**
Unemployed	**: 4**
Part time employment	**: 2**
Level of education	
Tertiary education	**: 7**
Basic education	**: 2**
Uneducated	**: 3**
Race	
All 12 participants were African	
Age group	
20 to 30	**: 2**
31 to 40	**: 5**
41 to 50	**: 3**
51 to 60	**: 2**
Total number of own children per school	
School one	
Parents	**: 5**
Teachers	**: 0**
School two	
Parents	**: 6**
Teachers	**: 0**
School three	
Parents	**: 4**
Teachers	**: 0**

Population:

Sampling is the process of selecting a population for a study, in line with a predetermined criterion. The target population for this study are teachers and parents. They are most suitable because of the necessitated requirements for online learning during the COVID-19 pandemic. Their traditional roles in teaching and learning have changed since the advent of COVID-19 and online learning. Their perceptions about using 4IR technologies in rural schools are yet to be explored, under these circumstances. As such, this study seeks to investigate their perceptions on the use of 4IR technologies in rural schools.

Sampling technique:

A non-probability sampling method was used for this research, purposive sampling refers to the selection of participants according to a particular criterion. The latter aims to assist researchers select the most suitable study participant, and to meet the objectives of the study. Parents and teachers selected for this study were from 3 rural schools within the Rustenburg Local Municipality. Parent participants had a learner attending the school during the COVID-19 pandemic. Teachers interviewed, worked in the school during the national lockdown.

Data collection:

This study employed semi-structured qualitative face-to-face interviews to collect data. Such qualitative interviews gather information in the form of opinions, experiences and beliefs about a particular phenomenon. The primary focus here is to explore the perceptions of parents and teachers in rural schools on the use of 4IR technologies. Perceptions entail their lived experiences in using these technologies, and therefore face-to-face interviews were chosen on the basis that previous research used different methods (dominantly secondary methods of data collection) to collect data in this field (4IR and rural education). Consequently, this selection could yield information-rich results. The researcher could examine the

research site surroundings for corroborating evidence and could also use the body language of the interviewees to probe for more information.

Data analysis:
This research used Braun & Clarke's (2012) method of thematic analysis to analyse the collected data. This method was chosen because it allows the researcher to make sense of shared and communal experiences and meaning within the data set.

Ethical considerations:
This study was approved by the Basic and Social Sciences Research Ethics Committee (BaSSREC) of North-West University Mafikeng Campus with ethics number N W U -01031-22-A7.

FINDINGS AND DISCUSSION:

The following themes were generated in response to the primary research question and subsequent indirect focus areas of the study respectively. Firstly, it is of utmost importance to list the types of 4IR technologies used in schools as indicated by participants:

1. What technologies does the school use for online learning?

Types of 4IR technologies in schools:
The following technologies were used during COVID 19 pandemic, and some are still being used as a means of communication between teachers and learners, for writing assignments, tests, homework and to access online resources. The figure below (table 2) provides a description of the types of technologies and the frequency with which they are used.

Table 2: Types of technologies used in schools.

Applications/software	Gadgets/hardware	Frequently used technologies
Zoom	Tablets	Cell phones
WhatsApp	Laptops/computers	Tablets
Facebook	Cell phones	WhatsApp
Microsoft teams		Facebook.

Mr Mfundisi, a teacher at one the schools, indicated that they preferred using more familiar technologies to minimize the complication of new technologies. He said:

> *Both teachers and student… (trained)… to use tablets and related applications on the device. However, at…each class we still spent…15 minutes or more where some learners needed additional assistance on how to access online resources or to operate the device...*

Mrs Pule on the other hand, a teacher from a different school, indicated that devices such as tablets that were provided by the school were used less frequently, due to rules put in place: as if the gadget got damaged or destroyed. She indicated the following:

> *The school distributed tablets among grade 12 learners to facilitate teaching and learning, but there was a proposed amount of R1500.00 that the parents were informed will have to pay in the event the tablet got scratched on the screen.*

She further added:

> *This discouraged the use of these tablets as parents did not want to risk the device being damaged and consequently pay the large amount of R1500.00 for a gadget that was even issued without any protective devices such as screen protector or a pouch.*

Another teacher who asked to remain anonymous provided the following view:

> *The R1500.00 amount resulted in learners using their parents' cell phones rather than the school issued tablets as they did not have cell phones of their own. This also was a problem because some learners' parents are working, and as such do not have round the clock access to the mobile device.*

She further indicated that some parents were complaining about how the school is depleting their data, and called them names like "Mma data," which when loosely translated means a person that finishes other people's data. She said the following:

> *At least three parents reached out to me to complain about how I am sending too much material to their children and how that is costing them in terms of mobile data. One parent went to the extent of calling me 'mma-data' because each time her phone rings it is obviously me and my never-ending announcements and learning material.*

Mr X, also a teacher, stated that there are various and valid reason why some parents and teachers are not keen to use new technologies. He provided the following view:

> *Many of the learners in this community come from very poor backgrounds. If you say to a parent here is tablet or computer for your child to use for academic purposes but you will pay this amount of money if this device gets stolen or damaged…the poor parent is struggling to.... put food on the table. How… (will they pay)…for a computer or gadget?.*

He went on:

> *This form of education where learners use technologies in schools is…a challenge financially…(and)…many parents are uneducated and…cannot operate their own cell phones. These very learners are the ones helping with reading and writing messages for them…(Introducing) technologies in schools could be more of a challenge than we think.*

Mr X also indicated that not only are technologies a problem to parents, but many of his colleagues are also not happy. This is what he had to say:

> *My fellow colleagues cannot use these technologies. A simple projector is a problem. Imagine telling Mr Y to teach through Zoom. It doesn't matter… (due to his)…amount of training. I will remain his assistant each time he has to teach using these technologies."*

Such data, reflects that software, application, hardware or device used in these schools are determined by factors such as device familiarity or technological savviness with applications. For example, WhatsApp was the most preferred tool to facilitate teaching and learning because it was easy to use for both teachers and learners, and everyone was mostly familiar with it. This does not mean the schools did not try other applications. Mr Mfundisi indicated the following:

> *We have used Microsoft teams and zoom before, but due to complications related to usage and connectivity issues, WhatsApp was certainly the software of choice.*

Giddens in his structuration theory argues that individuals in the late modern era are not bound to rigid traditional or cultural norms, on which they could not make individual choices. But in a post-cultural era, they are disembodied from their own tradition or culture. This implies that change through social structure cannot be fully imposed on individuals, but they can choose how and what change to accept. In rural communities, electricity, connectivity, unemployment, high illiteracy, and poverty pose a serious challenge. However, against such difficult contexts, education in these communities always manages to continue. People can navigate around such predicaments to partake in global digital transformation in their own contextually significant way.

Social structure in this case refers to necessary resources in the form of devices and rules on how to use these devices, something which remains largely a problem in these areas, and does indeed restrict and enable participation. Parents' unemployment or social class affected the use or non-use of technologies and

confirms Bourdieu's (1984) view that the position of one's social class is attended by perceptual schemas. Participant C, a learner's mother, indicated the following:

> *Learners that had owned a cell phone or computer before were more familiar with using digital devices. The struggle was mainly with learners that were from disadvantaged backgrounds.*

This implies that children whose parents could afford to buy them devices before the pandemic and digital transformation had an upper hand. Another participant, Mr X, also agrees with the fact that one's level of education affects what they know, and the extent to which they know.

> *Education where learners use technologies in schools is not only a challenge financially, but many parents are also uneducated...they cannot…operate their own cell phones.*

This speaks directly to parental involvement in their children's education and their contribution. Knowledgeability for Giddens also refers to ways of knowing in two ways, i.e., practical consciousness and discursive consciousness. These ways of knowing are influenced by the social backgrounds of individuals, and includes area of residence, level of education, occupation, social class, gender etc. In the data cited above, it is clear that the preference or the application used in the schools is determined by prior knowledge and cultural capital about a particular application. WhatsApp is a household software not only in urban areas, but rural communities also use this application for day-to-day communicational purposes. Hence it is much easier to use than other applications. In comparison to other schools in urban areas, Dube and Mlanga (2020) noted that both teachers and learners had no problem using application such as Zoom and Microsoft Teams.

2. What are the perceptions of parents and teachers on the use of 4IR technologies in rural schools?

The world is changing and so are the ways in which people engage in day-to-day activities, Mr Mfundisi thinks it is not ideal to resist 4IR changes in the education sector. He thus says:

4IR is important for development. To act blind to these changes is to throw away the future of our children.

He went on, and said the following:

> *The world is changing, and so is the world of work, not only for professionally qualified personnel. For example, in the so called 'kitchens' maids are using technologies for various purposes such as cleaning, washing, cooking and even for transportation…they are using Bolt now…as there are normally no taxis to many of white people's area of residence, where they are employed.*

Mrs Sithole a mother to two of the children attending in one of the schools noted a significant difference between schooling requirements in a previous era, and now. She remarked as follows:

> *You know during our time, we were using wood sticks to do mathematical calculations. My own mother told me they were using their fingers for the same purpose and now her grandchildren are using sophisticated technologies to learn inside and outside class.*

The education sector, as with other sectors, goes through much change in a single individual's lifetime. From using wood sticks in the classroom to using specialised technologies.
Mrs Dulls, who is also a mother, had the following to say,

> *Whatever is happening in the world today it is not to be denied in any way, as changes are always taking place. What I learned in school was simply to read, write and to be able to communicate effectively in the workplace.*

She further said:

> *My grandparents worked on the farm. All they needed to know by heart were names of the machinery they used, tools, seeds, and how to speak and write Afrikaans and Portuguese. Today*

my children are required to know different things altogether, they speak English, use these cell phones, computers and other things that I don't even know.

Parents also experienced the following: they were unable to help their children with schoolwork due to a lack of knowledge on using digital devices, and many found themselves stressing on behalf of children over the lack of connectivity and electricity. It is important to also note that teachers had different views about incorporating technologies during teaching and learning purposes. Some teachers indicated that they felt excited about the convenience of remote teaching, whereas others felt outdated when teaching, and that 4IR technologies are an unnecessary burden. 4IR was acknowledged by both parents and teachers as a necessary evil. However, factors such as low literacy, limited digital agility, unemployment and poverty were seen as serious challenges, and negatively affected both parental involvement and learner output.
Parental involvement when using digital technologies, particularly for the unemployed and uneducated, was reduced to a significantly low level. One parent indicated that since the introduction of technologies in schools, there has been a social distance between herself and her children, in as far as education is concerned. The study also discovered that learners found ways of relying on each other instead. For example, learners that did not have mobile devices relied on learners that had these devices for both academic resources and for acquiring skills and knowledge on how to use similar devices. Furthermore, the study discovered that there was a difference between learners whose parents could provide them with data, devices or necessary resources and those that could not own such important resources. Learners that owned a mobile device prior to the roll out of online learning, and had access to such devices or resources, had the necessary skills and knowledge to navigate through online learning. They could also have rounded the clock access to academic resources, such as soft copies of books, videos, articles and other such forms of cultural capital. Two teachers argued that such advantages provided they not only access to online educational resources, but also to perform better in class.

LIMITATIONS:

This study has had some limitations that can be summed up as follows. Firstly, the study had a small sample size due to time constraints as it was part of a master's dissertation. As such, this research provides a small scope of responses. Secondly, there is limited research on the topic particularly in South Africa, making it difficult to compare the findings of this study with other similar studies. Thirdly, the study followed a qualitative methodology making it difficult to generalise the findings to other areas with similar characteristics, and the findings cannot be replicated in the same way in other locations due the unique contexts of particular areas.

CONCLUSION AND RECOMMENDATIONS:

In summary, the study sought to investigate the perceptions of parents and teachers on the use of 4IR technologies in rural areas. The study followed a semi-structured qualitative methodology and answered two primary questions i.e., which 4IR technologies are used at rural schools? What are the perceptions of the parents and teachers on the use of these technologies? The study found that technologies such as WhatsApp, Facebook, Tablets and cell phones were frequently used. Furthermore, the study discovered that the use of these technologies is a challenge for both parents and teachers. Parents are confronted with the inability to be involved in their children' schoolwork owing to factors such as low levels of literacy, poverty and unemployment; while teachers have challenges in facilitating classes using these technologies due to misuse of the devices by learners, inability by teachers to use these technologies, poor connectivity and power outages. Based on the findings of this investigation, the study recommends that the Department of Education together with the schools, reorient and revise its policies, regarding learner orientations, and the (re) training of teachers and pupils on use of new technologies. School policies that seek to punish transgressions, discourage the use of government-provided devices in schools, particularly among the poor. In addition, the Department of Education should try to provide digital devices to learners from early on in their schooling careers. This could help improve their skills and in turn bring about efficiency in the classroom. To reduce problems that result from electricity and connectivity, the Department of Education should work together with ward councillors, chiefs and service providers to improve such services in these areas. Worsening issues around access to devices among the poor, even though such resources were provided, is also a problem that needs to be resolved with a multi-constituency in mind. Lastly, the study recommends for further research to be done, seeing that this study had a small scope and sample.

AUTHORS ACKNOWLEDGEMENT:

Not Applicable

FINANCIAL SUPPORT:

This research was funded by National Institute of Social Sciences (NIHSS) and by North West University Bursaries for a Master dissertation.

ACKNOWLEDGMENT:

This paper stems from the Master's work of Sishuba S.

CONFLICT OF INTEREST:

Not applicable.

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