BASIC SCHOOLS' CLOSURE AND REVIEW OF EDUCATORS' REMOTE TEACHING EXPERIENCES AND CHALLENGES IN SOUTH AFRICA PUBLIC SCHOOLS

Philip Kwashi Atiso Ahiaku[1], Morakinyo Akintolu[2]

[1]Department of Business Management, School of Management Sciences, University of South Africa, Muckleneuk, Pretoria, South Africa
ORCID: https://orcid.org/0000-0002-3636-4282

[2]UNESCO Chair on Open Distance Learning, College of Education, University of South Africa, Muckleneuk, Pretoria, South Africa
ORCID: https://orcid.org/0000-0002-1295-2012

✉Corresponding author: Morakinyo Akintolu, e-mail: akintl@unisa.ac.za

A B S T R A C T

The object of research: This paper looks to address the effectiveness of remote teaching during the lockdown.

Investigated problem: Education during the COVID-19 pandemic was affected remarkably due to the lockdown in most countries including South Africa.

The main scientific results: The paper highlights failures in the planning, management, and organization of remote teaching during the lockdown.

The area of practical use of the research results: The paper employs a mixed method approach to study the experiences of teachers and the challenges they faced during and after the lockdown. One hundred and forty-four (144) Life Sciences teachers responded to a survey using questionnaires, and another fifteen (15) took part in telephonic interview(s) that followed an interview schedule.

Innovative technological product: Based on these findings, the paper suggests that the government should invest in and ensure the availability of reliable communication tools, high quality internet connectivity, and actively promote the development of digital academic skills for both teachers and learners. Let's also suggest numerous steps that must be taken to develop a curriculum that reflects not only the perceptible change(s) in content knowledge, but also the learning experiences of teachers and learners.

Scope of the innovative product: The respondents were Life Sciences educators from public high schools in Mpumalanga province in South Africa.

1. Introduction

1. 1. The object of research

The overall objective of the paper is to address the effectiveness of remote teaching or online teaching in the basic schools in South Africa. In the 21st century education is not only confined to the four walls of the classroom but expected to be received anywhere. In so doing education would be available to a lot more people at anytime and anywhere in deepening of knowledge and creation of knowledge. The transformative power of such education would enhance the Sustainable Development Goals (SDGs) on the education agenda. It follows that education; particularly basic education is relevant in post-apartheid era in South Africa in modulating socioeconomic outcomes and reducing inequalities. The positioning of this study on modulating remote teaching during the COVID-19 pandemic and effect on education is based on three main trends in literature and policy cycles:

1) growing interest in digital and online platforms in South African schools;

2) growing evidence of exclusion and inequalities in the country.

1. 2. Problem description

The COVID-19 pandemic has thrown global education into a state of disruption. The world and South Africa in particular, have to deal with the disruptions and challenges posed by the pandemic. When the pandemic appeared, the South African government did not hesitate to act and declared a state of disaster and national lockdown on 27 March 2020. The national lockdown resulted in the closure of all educational institutions, from primary schools to institutions of higher learning (universities). During the lockdown, the Department of Basic Education (DBE) adopted remote learning

environments to mitigate the closure of schools, with a focus on final year (Grade 12) learners who had to meet their teaching and learning goals in order to graduate from high school.

The unexpected and immediate transition from face-to-face to remote teaching was introduced to mitigate the impact that school closures would have on children, especially in terms of learning time. This initial response of the DBE was the introduction of distance or remote learning through the national electronic and print media, such as TV stations and radio programs, printed materials, and websites. As the pandemic progressed, and the lockdown continued, remote teaching and learning was done using streaming video and conferencing technologies such as Zoom, Google Classroom, Facebook, and Microsoft Teams. The adoption of remote teaching and learning in response to the lockdown stimulated education experts, teachers, learners, and parents to adapt to remote learning solutions.

However, remote teaching exposed several constraints and challenges during implementation. Policy-think tanks and educational specialists viewed these developments as deepening the inequalities in our educational system, which runs on two parallel educational systems [1, 2]. This issue is to be expected, as some schools have access to digital and electronic resources, while others do not. For example, the Quintile 5 and 4 schools, which are situated in towns and cities, are well-endowed with resources, while the Quintile 3, 2 and 1 schools, which are found in lower socioeconomic spaces and remote geographical spaces, such as townships and rural areas, had limited to no access. On a national level, the majority of South African schools are struggling with a shortage of teaching and learning materials, a lack of technological equipment such as computers, electricity, and internet connectivity; with only 20 % of schools having access to internet connectivity needed for online teaching and learning [3].

According to the General Household Survey (2018), only 10.4 % of the total population in the country had internet at home, of which only 1.7 % are in rural areas. However, mobile internet access is slightly higher with 60.1 % and 43 % [4, 5].

Given these intervention methods and the issues of inequality in the educational system that these interventions exposed, the question arises; 'whose interests are being served by the move to remote teaching and learning?' With this question in mind, we examined the effects of school closures and the effectiveness of remote learning in public basic schools through the lens of teachers. The research question answered in this study is what are the strategies, experiences and challenges encountered by educators during the lockdown in delivering lessons through remote teaching?

The following specific research questions were answered:

1. Which digital and online platforms were available to teachers during the lockdown to promote remote teaching and learning in high schools?

2. What strategies were employed, and what were the experiences of teachers in delivering lessons through remote teaching during the lockdown?

3. What were teachers' perceptions of remote teaching and learning, and what challenges did they face during the COVID-19 lockdown in South Africa?

1. 3. Suggested solution to the problem

A review of existing literature highlighted the experiences of teachers in the areas of technology, pedagogy, and socioeconomic issues. The technological issues related mostly to the availability and quality of infrastructure and how accessible it was to both teachers and learners. The pedagogical issues that were raised included the competence levels of teachers with regards to the application of the digital platforms and other resources available for the transmission of the lessons. The socioeconomic issue relates to the interaction between teachers and learners, and the respective support they received, or did not receive, from their schools and within their home environments.

Availability of digital infrastructure and remote teaching.

The successes and failures of remote teaching and learning depend largely on the availability of internet-capable devices (such as smart phones, tablets, laptops, and desktop computers) and internet connectivity. Although teaching through remote technology was nothing new, it became topical during the lockdown and ensuing closure of schools. Most schools immediately shifted from the face-to-face interactions to remote teaching using technology to deliver remote teaching and learning. However, digital inequality in terms of resource distribution, limited technical knowledge, underdeveloped computer literacy, and the impact of Information and Communication Technology (ICT), affected the success of remote learning and teaching across the globe [2, 6]. Both developed and developing nations have experienced some successes and challenges during remote teaching amidst

the pandemic. It came to light that teachers with access to electronic devices and high-speed internet connections, and those who possessed digital skills and experience in using digital platforms, were successful with their engagements and were able to cope with the challenges [7]. In most developed countries, the required infrastructure for remote learning had generally been available at basic schools regardless of their socioeconomic background, and most teachers had already engaged in some form of remote teaching and learning at the onset of the pandemic [8, 9].

However, poor digital infrastructure was reported in some parts of the globe, especially Third-world countries. Research conducted in Portugal revealed that poor infrastructure (including the poor quality and availability of computers and related software, and unavailable internet) frustrated teachers in their attempts to teach remotely [10]. Hebebci, Bertiz and Alan [11] contend that a lack of technological infrastructure was not only limited to learners but also educators. In Turkey, students and teachers were not satisfied with the online programs because of inadequate, or in some instances the complete lack of, technological infrastructure [11]. In South Africa, the situation was intensified because of the government's poor distribution of ICT infrastructure in the country [12]. Until now, only about 20 % of homes have computers of which 10 % are connected to the internet [4]. This confirms the reports of Amnesty International [1] which found that rural and peri-urban locations in South Africa are deprived of infrastructure [13, 14].

Teachers' experience and implementation of remote teaching.

The personal interest and satisfaction of educators in the use of technology and pedagogy are critical for the success of remote learning. Educators should not only possess content and subject expertise but should also be knowledgeable of content delivery methods and should be able to provide at least basic technical support services to their students in order for both parties to benefit from the remote learning experience. Computer literacy and technical knowledge is a prerequisite for successful remote learning. Flamholtz and Randle [15] contend that the attitudes of teachers towards change, the level of adaption, as well as the trust imposed on the change itself, are all factors that affect the appropriateness of their teaching methodologies during remote teaching. In another development, McKenzie, and Scheurich [16] stipulate that school 'cultures', such as the organization of work, norms and values, as well as interpersonal relationships with learners and parents, contribute greatly to the success of remote learning. Ibrahim et al. [17] stimulate that the level of instruction and clarification provided, access to technology, time, motivation, and support to participate in remote teaching, is vital. The success of remote teaching also depends on the extent of previous engagement of teachers and learners in ICTs and how effectively and efficiently technology was incorporated into the school curriculum. Most schools, especially the pre-tertiary institutions, experience a low level of ICT integration [18, 19]. Teachers with knowledge of, and experience in, ICTs and its related platforms are likely to have a positive impact on remote teaching and learning. The teachers who were most engaged and coped the best were those with prior experience with remote instructions [7, 18, 20].

2. Research method

The COVID-19 pandemic also required researchers to consider new means of remote data collection. This data for this research was collected over a five-month period during the lockdown and immediately after the reopening of schools. The research process was conducted remotely using WhatsApp as the data collection tool.

The data was collected using a quantitative and qualitative approach where an intensive literature review was conducted together with online interviews and surveys. The survey was conducted using a questionnaire designed on a Google form for educators. The questions formulated to help answer the main research questions. The questionnaire featured the relevant consent section to ensure participants' informed consent. In total, 144 teachers responded to the questionnaire, while an additional 15 were interviewed telephonically. The questionnaire was self-constructed with close-ended questions, with some options to answer questions on biographical data, availability of digital infrastructure, mode of remote teaching transmission, and the perception of teachers regarding remote teaching. The questionnaires were distributed to teachers via their existing communication networks (groups) on WhatsApp.

A semi-structured interview was conducted telephonically, where teachers were chosen at random to be interviewed. The interview covered areas such as the availability and level of ICT usage

before and during the COVID-19 pandemic, the methods and challenges of implementing remote teaching and learning, and their attitudes towards remote teaching.

The data collected from the questionnaires was analyzed through the software Statistics Package for Social Science (SPSS) version 25 of IBM. The data was presented as descriptive using tables where necessary. The resulting data from the structured interview were recorded and analyzed using Atlas-ti software with a deductive approach, to develop a thematic categorization and subsequent thematic content analysis. The emerging categories were redefined and organized into higher-order categories, whenever relevant, to aid in the identification of the most relevant themes being addressed by the participants and to help convey organization and structure in the data presented. Rooted in the qualitative and interpretive approach, the feedback provided by respondents was presented verbatim to illustrate the positions expressed.

3. Results

3. 1. Biographical data

The respondents were Life Sciences educators from public high schools in Mpumalanga province in South Africa. The participant group reflected South African demographics, with the majority (92.4 %) of educators being Africans, of which more than half (58.3 %) were females. The majority of the respondents (67.4 %) were between the ages of 36–45. This is an indication that most educators were made of the younger population, with the elderly population between the ages of 50 and above years forming only 3.5 %. The implications are that the younger population of teachers is likely to be computer literate and technologically advanced, will be able to use electronic devices and would also be more involved in remote teaching. The qualifications of the respondents showed that they are highly qualified and able to teach. The majority (68.1 %) of teachers hold a Bachelor's degrees in education, with 3 (2.1 %) in possession of Doctorates. The various school types were represented in the data. The majority of the respondents (50.7 %) came from the quintile 3 schools. In total, the quintiles 3, 2 and 1 represented more than three quarters of the respondents. The quintile 3, 2 and 1 schools fall within the lower socioeconomic demographic of South Africa and are found in rural areas and townships. Most of these schools are not well-resourced or equipped. The remaining quintile 5 and 4 schools, most of which are the former model C schools, represent the middle and higher socioeconomic demographic and are mostly found in towns and cities. These schools are well endowed with resources.

Table 1

Respondents' and their schools' characteristics (n=72)

Characteristics		Frequency	Valid percentage
Gender	Male	84	58.3 %
	Female	60	41.7 %
Age (years)	Below 25	3	2.1 %
	26–35	7	4.8 %
	36–45	97	67.4 %
	46–55	32	22.2 %
	56+	5	3.5 %
Race	Africans	133	92.4 %
	White	5	3.4 %
	Indian	3	2.1 %
	Coloured	3	2.1 %
Level of qualification	Bachelor	98	68.1 %
	Honours	29	20.1 %
	Masters	14	9.7 %
	doctorate	3	2.1 %
Type of school	Quintile 5	15	10.4 %
	Quintile 4	17	11.8 %
	Quintile 3	73	50.7 %
	Quintile 2	25	17.4 %
	Quintile 1	14	9.7 %

Source: Generated by authors from data.

3. 2. Presentation of results

This section presents an overview of teachers' experience and expectations concerning remote teaching during the lockdown and represents the three main themes of the study:

1) state of digital infrastructure for remote teaching;

2) teachers' implementation of remote teaching;

3) potential challenges experienced during implementation.

State of digital infrastructure for remote teaching.

The responses regarding resource availability for implementation of remote teaching and learning (Y=Yes, S=Somewhat, and N=No).

From **Table 2**, the result shows that the vast majority of respondents do not have access to technological equipment such as computers. Out of the 144 respondents, only 43 (29.8 %) have access to functional computers. The majority of respondents 96 (66.7 %) do not have any computers at all to facilitate remote teaching. Lastly, 5 (3.5 %) respondents indicated that they have computers, but that these are not available to be used for remote teaching. The results also show that out of those who have computers, only 32 (22.2 %) were connected to internet services. The survey clearly shows that very few schools in the study area have access to computers, which is a basic necessity when it comes to remote learning. However, the majority of teachers 110 (76.4 %) have personal laptops or other devices, such as smartphones or tablets, that function just as well as laptops or computers. The results show that the majority of learners, 110 (64.6 %), have smartphones that can also be used to access remote teaching. However, those who do not own smartphones will be marginalized if remote teaching is rolled out. The results clearly show that the essential technological devices to facilitate remote teaching and learning were only available to quintile 4 and 5 schools, with the majority of quintiles 3, 2, and 1 left out.

Table 2

Type of resources in the schools

Column A		Column B		
Statement		**Response**		
Item No.	**The type of resources in the school**	**Y**	**S**	**N**
1	Presence of functional computers	43 (29.8 %)	5 (3.5 %)	96 (66.7 %)
2	Computers are connected to internet	32 (22.2 %)	3 (2.1 %)	109 (75.7 %)
3	Functional tablets for learners	5 (3.5 %)	0 (0 %)	139 (96.5 %)
4	Teachers have personal laptops for use	78 (54.2 %)	32 (22.2 %)	34 (23.6 %)
5	Teachers have access to smartphones	144 (100 %)	0 (0 %)	0 (0 %)
6	Learners have access to smartphones	37 (25.7 %)	56 (38.9 %)	51 (35.4 %)

Teachers' experiences and implementation of remote teaching.

Teachers who took part in remote teaching answered questions on implementation and shared their experiences during remote teaching. The survey reveals the different types of digital platforms used by teachers during the period. **Table 3** details the variety of modes of platforms used during the COVID-19 pandemic. No particular Learning Management System (LMS) has been designed for basic schools by the DBE, however, teachers used a variety of social media platforms and online meeting apps, with most respondents using WhatsApp, Facebook, Email, Google Classroom, and ZOOM.

The choice of a particular digital platform depends on various including accessibility, internet connectivity, and the type of activity to be undertaken. Almost all respondents (61.1 %) were using WhatsApp for personal interactions among educators and learners and sharing of teaching materials. 17 respondents (11.8 %) used Google Classroom for activities involving the submission of assignments. Similarly, other respondents (6.9 %) used Emails for assignments. ZOOM was used by 14 respondents (9.7 %) to live stream online teaching. Of all platforms, Facebook (3.5 %) was least used by teachers during the pandemic. It must be noted that respondents generally demonstrated a lack of knowledge regarding a number of remote teaching platforms such as WebEx, Microsoft Teams, and Google Meet, which were also available during the lockdown. The decisions that teachers made in terms of which messaging applications to use for remote learning, gave a clear sign that the respondents were aware of the pedagogical use of these platforms to deliver interactive teaching and learning. Teachers explained that they found WhatsApp more convenient because most learners have a smartphone were already well-versed in using WhatsApp for communication. One teacher noted:

I used WhatsApp mostly because almost all my learners have smartphones either personal or belonging to their parents.

I couldn't use the remote platforms because I have no basic training as to how they are used.

The department provides us with materials through some websites and all I do is download and upload onto my WhatsApp and send them to my learners. Those with emails I sent through to them.

Table 3
The different digital platforms of remote teaching

Column A		Column B	
		Response	
Item No.	Digital platforms	No	%
1	WhatsApp	80	61.1 %
2	Facebook	5	3.5 %
3	Emails	10	6.9 %
4	Google Classroom	17	11.8 %
5	Zoom	14	9.7 %

Challenges of implementation of remote teaching.

The survey also provided insight into the challenges that teachers experienced with the implementation of remote teaching. Many participants were from remote areas of the province with low socioeconomic conditions (quintiles 3, 2 and 1) and therefore, do not have the basic technological devices such as desktop computers and laptops to participate in remote teaching.

I don't have the relevant gargets such as desktops, laptops and scanners that were needed during the lockdown to participate in the remote teaching both at school and personal ones.

Even though I have phones and the majority of learners also have but it is difficult teaching using phones. What exacerbated the situation for us was the closure of internet cafes where we mostly rely on them for our computer work.

Another major challenge encountered by the participants was unstable internet services. The participants stated that the mobile networks were unstable most of the time during video and audio teachings.

Sometimes you have a stable and another time the unstable network. These are technicalities you have no control over

Participants from rural schools also faced challenges with electricity supplies. Most of the participants had significant challenges with interrupted electricity (due to 'load shedding') that also affects the network connectivity, as well as the functioning of devices themselves. This means that the availability of internet-enabled devices was not the only challenge, but that there were technical challenges as well. Findings from the interview show that limited access to networks prevented respondents from participating in remote teaching, while those who did participate were not sure of the outcomes, as they often lost contact with the learners due to network issues. The implication is that most learners were precluded from remote learning.

In addition to the technical issues mentioned above, most educators exhibited a lack of relevant skills to facilitate remote teaching. Most educators, especially those from low socioeconomic communities, did not operate digital devices before the lockdown and failed to use them during the lockdown.

The implementation of remote teaching was quite challenging to most participants because of a lack of technical operational knowledge of digital devices, as well as remote platforms and their relevant applications. It was very clear from the survey that most of the participants were not prepared for remote teaching.

I have not used any garget to teach during my entire teaching career and have very little knowledge of operating one. I left training college at a time when computer usage was non-existence at the colleges.

Participants also reported that the cost of data was one of the inhibiting factors during the implementation of remote teaching. The participants stated that data was costly not only to them but to learners as well. The parents could simply not afford the huge cost of data in South Africa. The huge cost of data discouraged teachers from participating in remote teaching effectively.

During the lockdown, I tried to send materials to my learners through their WhatsApp on their mobile devices but only to find out that for days and weeks the sent documents are still pending and had not been delivered. Meaning the learners do not have data to open and download the materials. I was discouraged and stopped sending materials.

I couldn't afford data for teaching online. Even though I attempt to use WhatsApp to communicate with my learners uploading some documents takes quite an amount of the data which were not provided for us by the school.

My data was personal stuff and couldn't afford to use it to teach because no one was prepared to buy me data, not even my principal.

4. Discussion

This paper studied the experiences of teachers in remote teaching during the COVID-19 pandemic lockdown. The research provides varied outcomes on infrastructure preparedness and challenges facing remote teaching in South Africa. Presented below are the findings from teachers' points of view viz the new trends in Africa and the rest of the world.

It was found that the DBE's initiative for remote teaching was received and implemented. However, while some countries were prepared (to varying extents) for remote teaching, the policy for remote teaching in South Africa during the lockdown was uncertain. The findings for infrastructure readiness show that most schools in the country had (continue to have) infrastructural deficits from the start of the program. This confirms the earlier studies that South Africa is suffering from a digital infrastructure deficit, especially in rural and townships schools [4, 12]. Schools faced specific problems, such as a lack of desktop computers, laptops, tablets, and scanners, which compromised readiness to teach remotely. This situation further revealed the infrastructural gap between the quintile 5 and 4 schools (high and medium socioeconomic schools) and the rural schools [2, 6]. While in developed, regardless of socioeconomic status benefited from technological infrastructure [8], the case of South Africa is different only the middle- and high-income earners had access to sufficient devices, such as laptops, tablets, and smartphones, data, and reliable internet connections.

Several available remote teaching tools like the ZOOM, Google Meet, Facebook, Google Classroom, and Emails were used to implement and deliver lessons to learners. Very few teachers used ZOOM and Google Meet for live streaming of lessons because of their inability to use these platforms due to lack of training. However, the majority of teachers who participated in remote teaching with their learners during lockdown used WhatsApp for both instructional and messaging purposes [21]. WhatsApp was used predominantly for the following reasons: firstly, most learners had smartphones, and those without personal devices could use those belonging to their parents, and secondly, teachers were accustomed to the use of WhatsApp on their smartphones for day-to-day communications. Thirdly, learners have created various WhatsApp groups for communication and sharing of information in their various subject areas. The use of WhatsApp can also be attributed to the lack of orientation and training for teachers on the use of these modes of remote teaching.

In addition to the challenges faced because of a lack of equipment, the general lack of implementation and integration of technology into teaching also hampered participation. The survey revealed that teachers lack sufficient skills and knowledge to participate in remote teaching. This is a result of teachers and schools not promoting the use of appropriate technological pedagogy. This study confirms earlier research on the low levels of knowledge and skills possessed by teachers when it came to the integration of technology in teaching before the COVID-19 pandemic lockdown of pre-tertiary education [8].

Apart from the technological challenges that were faced in terms of promoting remote teaching and learning, teachers encountered interrupted power supply and unreliable internet connectivity. The national power supply was under stress during the COVID-19 lockdown and most parts of the country were under 'load shedding' where power was being rationed. Irrespective of the power rationing, the majority of schools in Gert Sibande district do not have access to a power supply at all. This study confirms the assertion of Stat SA [4] that most South African schools do not have access

to electricity. The remote rural areas were without internet connectivity or broadband services, which affects both teachers and learners in participating in remote teaching, especially in terms of teacher-learner interaction. This finding is attributed to most schools in developing countries [12].

Limitations and future research. This paper is written in the midst of pandemic but has potential for future research in general in the use of technology in secondary schools. Furthermore, this study is situated in one district, there is need to understand the teaching and learning with technology in post pandemic in other parts of the country.

5. Conclusion

Education during the pandemic deteriorated remarkably throughout the globe due to the lockdown and the sudden forced migration to remote learning that ensued. Most developing countries, including South Africa, are faced with difficulties in handling the 'new normal', especially the sudden shift in educational planning, management, and organization. The policy difficulties were aggravated by lack of resources, technical infrastructure, lack of skills, and poor financial basis. The failures of our educational system that were exposed during the lockdown is an eye-opener, and it is now apparent that South Africa is facing a further crisis in terms of education. If the situation is to be remedied, the DBE has to develop and employ multicultural approaches towards digital transformation, especially in terms of basic education throughout the country. This would be the best way to deal with the current inequalities in the educational sector regardless of the geographical and socioeconomic location of the school, if there is any hope of improving the functionality of online education. In so doing, the government must invest and ensure the availability of reliable communication tools, high-quality internet connectivity, develop the digital academic skills for both teachers and learners, and promote technology-enabled learning for learners during and after the COVID-19 pandemic.

For the development and implementation of remote teaching and learning in South African schools, educational policymakers and school managements are encouraged to support schools, teachers, and learners through the provision of essential technological and pedagogical facilities.

Influenced by COVID-19, South African schools can promote a remote approach to both teaching and learning. This study has exposed the inadequacy of digital devices in schools in Gert Sibande district and offered the opportunity to provide technological equipment in different forms such as laptops, tablets and sometimes smartphones to enable teachers to offer lessons through various remote applications.

The lack of knowledge and skills among respondents, coupled with their failure to identify the various technological and pedagogical strategies needed for effective remote learning, confirms the need to:

1) actively promote remote learning;

2) improve the quality of high school education in general;

3) develop the skills and expand the knowledge of teachers in terms of ICT integration in remote teaching and learning.

The study shines a light of positivity on the situation, the COVID19 lockdown has inadvertently created an opportunity to improve the quality of education through the much-needed advancement of policies that will help to provide opportunities for individual teachers.

Finally, the COVID-19 pandemic has further deepened the existing gap in national education, created by the rural-city dichotomy. This is a unique opportunity for the national government and Department of Basic Education to bridge the gap by affording rural schools with the basic infrastructure and services needed to provide quality education for all.

Conflict of interest

The authors declare that there is no conflict of interest in relation to this paper, as well as the published research results, including the financial aspects of conducting the research, obtaining, and using its results, as well as any non-financial personal relationships.

Funding

There is no specific source of funding for this project.

Data availability

Manuscript has data included as electronic supplementary material.

References

[1] Broken and unequal: The state of education in South Africa (2020). Amnesty International. Available at: http://www.amnesty.org/en/documents/afr53/1705/2020/en/ Last accessed: 12.06.2020

[2] Spaull, N. (2015). Teachers in South Africa: Supply and demand 2013-2025.CDE In-depth. Johannesburg: Centre Development and Enterprise.

[3] National Educational Infrastructure Management System (NEIMS) standard Report August 2019 (2019). DBE (Department of Basic Education). Pretoria: Government Printers.

[4] General Household Survey 2018. Selected development indicators. Statistical Release PO318 (2019). Stat SA. Pretoria: Government Publications.

[5] Valodia, I., Francis, D. (2020). South Africa needs to mitigate the worst of its inequalities in attacking coronavirus. The Conversation. Available at: https://theconversation.com/south-africa-needs-to-mitigate-the-worst-of-its-inequalities-in-tackling-coronavirus-135564

[6] Remote learning and COVID-19. The use of educational technologies at scale across an education system as a result of massive school closing in response to the COVID-19 pandemic to enable distance education and online learning (2020). World Bank. Available at: https://www.unapcict.org/resources/ictd-infobank/remote-learning-and-covid-19-use-educational-technologies-scale-across-education-system-result-massive-school-closings

[7] Jelińska, M., Paradowski, M. B. (2021). Teachers' Engagement in and Coping with Emergency Remote Instruction During COVID-19-Induced School Closures: A Multinational Contextual Perspective. Online Learning, 25 (1), 303–328. doi: https://doi.org/10.24059/olj.v25i1.2492

[8] Duraku, Z. H., Hoxha, L. (2020). The impact of COVID-19 on education and on the well-being of teachers, parents, and students: Challenges related to remote (online) learning and opportunities for advancing the quality of education. Available at: https://www.researchgate.net/publication/341297812_The_impact_of_COVID-19_on_education_and_on_the_well-being_of_teachers_parents_and_students_Challenges_related_to_remote_online_learning_and_opportunities_for_advancing_the_quality_of_education

[9] Legon, R., Garrett, R., Fredericksen, E. E., Simunich, B. (2020). CHLOE 5: The pivot to remote teaching in spring 2020 and its impact. The Changing Landscape of Online Education.

[10] Seabra, F., Teixeira, A., Abelha, M., Aires, L. (2021). Emergency Remote Teaching and Learning in Portugal: Preschool to Secondary School Teachers' Perceptions. Education Sciences, 11 (7), 349. doi: https://doi.org/10.3390/educsci11070349

[11] Hebebci, M. T., Bertiz, Y., Alan, S. (2020). Investigation of Views of Students and Teachers on Distance Education Practices during the Coronavirus (COVID-19) Pandemic. International Journal of Technology in Education and Science, 4 (4), 267–282. doi: https://doi.org/10.46328/ijtes.v4i4.113

[12] Dube, B. (2020). Rural online learning in the context of COVID 19 in South Africa: Evoking an inclusive education approach. Multidisciplinary Journal of Educational Research, 10 (2), 135–157. doi: https://doi.org/10.17583/remie.2020.5607

[13] Nixon, K. (2019). Searching for mermaids: capital, and the digital divide in a rural South African primary school. New York: Routledge, 19.

[14] Hetrick, A. R. (2019). Using the technology acceptance model to determine student perception of e-learning readiness in Kazakhstan. Boise State University. United States. doi: https://doi.org/10.18122/td/1524/boisestate

[15] Flamholtz, E. G., Randle, Y. (2008). Leading strategic change. Cambridge: Cambridge University Press. doi: https://doi.org/10.1017/cbo9780511488528

[16] McKenzie, K. B., Scheurich, J. J. (2008). Teacher resistance to improvement of schools with diverse students. International Journal of Leadership in Education, 11 (2), 117–133. doi: https://doi.org/10.1080/13603120801950122

[17] Ibrahim, N., Fadzil, N. H. (2013). Informal Setting for Learning on Campus: Usage and Preference. Procedia – Social and Behavioral Sciences, 105, 344–351. doi: https://doi.org/10.1016/j.sbspro.2013.11.036

[18] Portillo, J., Garay, U., Tejada, E., Bilbao, N. (2020). Self-Perception of the Digital Competence of Educators during the COVID-19 Pandemic: A Cross-Analysis of Different Educational Stages. Sustainability, 12 (23), 10128. doi: https://doi.org/10.3390/su122310128

[19] Sokal, L., Eblie Trudel, L., Babb, J. (2020). It's okay to be okay too. Why calling out teachers' "toxic positivity" may backfire. EdCan, 60 (3).

[20] Mishra, L., Gupta, T., Shree, A. (2020). Online teaching-learning in higher education during lockdown period of COVID-19 pandemic. International Journal of Educational Research Open, 1, 100012. doi: https://doi.org/10.1016/j.ijedro.2020.100012

[21] Mascheroni, G., Saeed, M., Valenza, M., Cino, D., Dreesen, T., Zaffaroni, L. G., Kardefelt-Winther, D. (2021). Learning at a distance: Children remote learning experiences in Italy during the COVID-19 pandemic. UNICEF Office of Research: Innocenti, Florence. Available at: https://www.unicef-irc.org/publications/1182-learning-at-a-distance-childrens-remote-learning-experiences-in-italy-during-the-covid-19-pandemic.html