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RESEARCH ARTICLE

# Rethinking curriculum implementation in time of COVID-19 and beyond: lessons learnt from rural science teachers

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## Abstract

The COVID-19 pandemic has influenced the way teaching and learning is carried out in South African schools. Policy decisions to curb the spread of the virus were superficially conceived as a health problem as opposed to an understanding of the interconnectedness of education in society. For teaching and learning to continue, schools were compelled to either rotate their learners or embrace remote teaching. Irrespective of the numerous curriculum reforms, curriculum implementation in South Africa has been in a moribund state with little attention given to rural science teachers. In this article, we explore how science teachers in rural areas implemented the curriculum during the COVID-19 pandemic and what lessons could be learnt from their experience to foster the curriculum implementation discussion in South Africa. We used a qualitative research approach and phenomenology as our research methodology. Nine rural science teachers were purposively selected for a semi-structured interview. An interpretative phenomenological analysis was used to analyse the data. Our findings revealed that the government's response to the pandemic appeared to have overlooked already existing fundamental problems associated with curriculum implementation in rural areas. We learnt in this study that curriculum implementation is narrowly conceived as a classroom pedagogic exercise. As an implication, there is a need for curriculum implementation reforms in South Africa, one that would consider contextual curriculum theorising and the experiences of rural science teachers.

**Keywords** Curriculum implementation · Curriculum studies · Rural science teachers · Post-COVID-19

## Introduction

The infectious potential of the COVID-19 pandemic required that inevitable measures be taken as a way of limiting the spread of the virus. These measures were the closing of schools, prohibition of public gatherings, social distancing, wearing of face masks, and the washing of hands (sanitisation). This required schools to move to online teaching irrespective of geographic locations and the availability of resources. The closure of schools interrupted the learning of almost 17 million South African learners from pre-school to secondary school (Stats SA, 2022). New educational policies and regulations were designed, such as adjusted academic timetable, mode of delivery, and catch-up of curriculum lost time. These policy measures seem superficial and appeared to be a desperate attempt by the Department of Basic Education to return to normal in the face of the COVID-19 pandemic (Christie, 2021; Maistry, 2021). The Minister of Basic Education, Angie Motshekga, describes her department's approach to the pandemic as mainly a health problem, rather than as a social, economic, and political problem (SABC News, 2020; 1:43). This unfortunate statement by the minister portrays a narrow understanding of the complexities surrounding education in contemporary society, a lack of imaginative thinking to envisage a socially just society through basic education, and a systematic normalisation of inequality in schooling.

The government's improvisation to save an impending collapse of the academic year by reinforcing the normalisation of inequalities drew criticism from Ramrathan (2021, p. 383) as he argued that it "illuminates a technical concern of curriculum coverage rather than a curriculum concern of what learning should be pursued post-COVID-19". In addition, the move by the government fortified an already criticised technical understanding of curriculum implementation which tends to ignore the complex ways that teachers make sense of the curriculum (Blignaut, 2008). Meanwhile,

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for teachers and learners in rural areas, this move excluded them from schooling since they were not able to "access online resources due to a lack of infrastructure, the unavailability of electricity and electronic gadgets" (Dube, 2020, p. 137). Before the pandemic, online teaching and learning was a non-occurrence in rural South African schools. Most teachers in rural areas struggled with online teaching themselves in the few areas where the resources were provided (Soudien, 2020). It appeared that the use of online learning favours urban and affluent schools more than their counterparts in rural areas. As a consequence of curriculum implementation, through online learning, the gap between the poor and rich became wider as opposed to uniting the nation in the fight against COVID-19 (Dube, 2020).

Science education is often regarded as a priority in South Africa, as it embodies the potential for economic growth, transformation, and development. This has partly accounted for the number of post-1994 curriculum reforms that have taken place in South Africa, all of which have perpetuated and replicated a poor record of curriculum implementation. Several studies have been carried out to understand and seek ways to best address the ongoing problem of curriculum implementation especially as it relates to science education (Koopman et al., 2016; Ojo & Mathabathe, 2021; Taole, 2015). Yet, the problem persists, particularly in most rural areas despite technological innovations in education and a considerable focus on learner-centred teaching. If anything, the COVID-19 pandemic has simultaneously exposed and exacerbated the moribund nature of curriculum implementation in South Africa. Soudien (2020, p. 6) initiated a challenging invitation by asking the question what necessary intellectual conversations and social justice-inspired educational research does the pandemic provoke, at this time of existential crisis or "systemic shock"? In this article, we take up this challenge by exploring the lived experiences of science teachers in rural areas as they implemented the curriculum during the pandemic and the lessons that could be learnt from their experiences to foster the post-COVID-19 curriculum implementation discussion in South Africa.

## Curriculum reforms in South Africa and their inattention to curriculum implementation

South Africa has undergone several curriculum reforms since the emergence of the new democratic dispensation in 1994. The central objectives behind these reforms were mainly to correct the past imbalances and to transform South Africa into a globally competitive state. This was achieved through a rethink of the curriculum considered to be inclusive, increasing participation of stakeholders, and an infusion of democratic principles (Booyse & Du Plessis, 2014). Mismanagement and resource constraints have affected the implementation process to a variable degree across schools. Much of this is because curriculum policy reforms have considered curriculum implementation as a superficial exercise that would be supported and enhanced mainly by the provision of resources.

The birth of Curriculum 2005 (C2005) was rooted in the principles of *Outcome Based Education* (OBE) long practised in global north countries (Du Preez & Reddy, 2014). C2005 provided teachers with greater professional autonomy, expected them to have new knowledge, linguistic composition, and applied competencies to use new technologies in their classroom. Despite being introduced as an immediate response to already existing problems, many teachers failed to translate the intended aims of C2005 into practice partly because of the use of confusing terminologies in the curriculum (Blignaut, 2009; Hoadley, 2012). This was a missed opportunity by the South African government and academics to consider generating theoretical perspectives of curriculum implementation that would suit the broader South African context bearing in mind the extent to which inequality exists in the education system. The inadequate empowerment of teachers, learning resources, and no alignment between content and assessment compromised the possibility of a successful curriculum implementation (Hoadley, 2012).

Due to flaws in the implementation of the curriculum, C2005 was changed through review committees and was later renamed as *Revised National Curriculum Statement* (RNCS) in 2000 and introduced between 2002 and 2006 for all grades. The principles of OBE remained the basis upon which curriculum implementation was to transpire. Irrespective of the changes made in the reformed curriculum, there was evidence of poor curriculum implementation mainly due to teachers struggling to understand the changes made (Blignaut, 2008; Koopman et al., 2016). Yet again, there was a call for more resources (Kriek & Basson, 2008). Implementation was technically conceived and managed through accountability where teachers were expected to do administrative work as evidence of curriculum implementation. Science teachers' implementation of the new curriculum in rural areas and township schools struggled the most and this was evident in the academic performance of learners (Koopman et al., 2016). The South African government appears to have considered curriculum implementation as a one-size-fits-all practice (Blignaut, 2008; Du Preez & Reddy, 2014). The adoption of Eurocentric approaches to curriculum implementation without contextual considerations has not done much in assisting science teachers in rural schools. The influence of local understanding of knowledge constructs that could be helpful in enhancing curriculum implementation in rural areas requires more attention than is currently being provided by policy designers. This can be seen in how the government has responded in its address to the challenges posed by the pandemic. As Braidotti (2020)

would have it about government's response to the pandemic, "we" are in this together, but we are not one and the same.

The ongoing implementation challenges led to another review of the National Curriculum Statement (NCS) in 2009. The amendment was intended to improve curriculum implementation in which the NCS was renamed *Curriculum Assessment Policy Statement* (CAPS) in 2011. The problem associated with curriculum implementation seems unresolved with the introduction of the CAPS. Govender (2018) explores teachers' perspectives on implementing the CAPS curriculum and found that teachers felt inadequately provided with sustainable professional development programmes, guidance, and monitoring to assist in implementing the changes required. Meanwhile, Ojo and Mathabathe (2021) investigated the challenges of implementing CAPS and they found that the implementation gap between under-resourced and well-resourced schools remains wide. It is evident that curriculum implementation remains a challenge and COVID-19 exacerbated an already existing problem which cumulatively plays a contributing role to the poor quality of education. Blignaut's (2007, p. 50) assertion remains true to this day when he explains that "if we add and consider the multidimensional nature of educational change it underscores the complexity, difficulty, and ambivalence that accompanies all change efforts … policy has struggled … to be mirrored in the classroom practices of teachers". Those responsible to design the implementation of the curriculum seem to have a narrow understanding of curriculum implementation and have remained inattentive.

## Curriculum implementation in South Africa

In post-democratic South Africa, curriculum implementation has moved from a teacher-centred pedagogy to that of learner-centred. The change to learner-centred pedagogy is based on the premise that when learners actively participate in the process of teaching and learning, learning becomes more meaningful to them (Khan et al., 2017). The effectiveness of this pedagogic change is uneven across South Africa with rural schools playing an ever-ongoing catch-up due to several reasons such as insufficient support, inadequate resources, lack of parental involvement, photocopying facilities, poor school leadership, and unavailable subject specialists (Ojo & Mathabathe, 2021; Taole, 2015). This has negatively affected curriculum implementation in rural schools and corroborates with initial concerns raised in the *Report of the Review Committee on Curriculum 2005* about the difficulties of implementing C2005 effectively in rural areas (Chisholm et al., 2000).

Post-1994 curriculum changes in the NCS (from C2005 to CAPS) also depicted a change in curriculum implementation. This is due to accountability demands in which implementation of the curriculum is increasingly being centralised towards the Department of Basic Education (du Plessis, 2020). In this case, the curriculum (CAPS) is prescriptively designed with learning units that dictate to teachers when, what, and for how long topics should be taught and learned. Poorly resourced rural schools struggle to implement this as it gives the teachers little room for flexibility should there be an unanticipated disruption such as the COVID-19 pandemic.

For the most part, curriculum designers involved with the policy prescripts of curriculum implementation see themselves "as scholars engaged in scientific research process that gives them the opportunity to be neutral" (Huenecke, 1982, p. 290). In South Africa, such neutrality does not exist as the implication of the top-down approach to curriculum implementation has been found to be a contributor to inequality in the education system (Soudien, 2015). The worldview of curriculum policymakers in South Africa has been privileged to an extent that only such views are enacted and legitimised in structural curriculum discourses (Le Grange, 2007). The COVID-19 pandemic further exposed this inequality as curriculum implementation directives were mostly a reflection of schools with adequate resources to support online learning (Jansen, 2020; Soudien, 2020). There is, therefore, a need to rethink the suitability of curriculum implementation within the South African school context, one that would represent the views of all rather than that of a privileged few. This should be an important issue for curriculum studies scholars in South Africa, particularly those that grapple with the reconceptualisation of the curriculum.

## Curriculum implementation during COVID-19

Before COVID-19, teachers in rural schools were used to traditional forms of teaching which rarely needed or compelled them to use computers or any kind of electronic devices (Mseleku, 2020). Curriculum implementation was a basic function of chalk and talk. This process depicts rural science teachers' inadequate skills and sound knowledge of teaching sciences in already overpopulated classrooms (Bantwini, 2017). These challenges, associated with curriculum implementation of science subjects, compromise the quality and meaningful learning in rural schools. This is because rural teachers struggle with unavailable network, shortage of devices for online learning, reliance on internet cafés, lack of computer skills of some rural teachers, and a high cost of internet data. Under these circumstances, it is unrealistic to expect curriculum implementation of science subjects to the extent that learners in rural areas can achieve similar academic success as those in urban areas. The requirement, therefore, to use technology during COVID-19 was seen as a unique challenge to rural science teachers (Dube, 2020). For these teachers, a move to online learning required specific types of resources to mitigate the effects of curriculum

implementation during COVID-19 (Mseleku, 2020). The situation of science teachers in rural areas remains deplorable and curriculum implementation of science subjects in rural schools continues to be offered in the absence of laboratories and science tools (Dube, 2020; Hoadley, 2012). This has left most teachers in rural areas not knowing how they had to manage and implement the curriculum given their limited experience and knowledge of online teaching and learning (Dube, 2020).

To the credit of the Department of Basic Education and other stakeholders, remote learning programmes were designed along with a mandated reduction of the curriculum content for all grades except for grade 12. A report *COVID-19 and barriers to participation in education in South Africa* 2020 (Stats SA, 2022) revealed that only 11.7% of schools offered remote learning options nationally. Whilst in rural areas, 92.4% of schools could only offer a rotational option as a measure to contain the spread of the virus. Both remote and rotational options had implications for curriculum implementation as it disrupted the norm for both teachers and learners. Rural schools suffered the most in terms of lost learning time since they relied on rotation with learners attending school on alternate school weeks and may only get to engage with their teacher twice a week (Hoadley, 2020). The curriculum content was trimmed whilst there was a reorganisation of the Annual Teaching Plans (ATP) informed by context-specific guiding principles of feasibility and coherence. The change in curriculum content was mainly a reorganisation of the content and assessment as opposed to the actual trimming of the curriculum (Hoadley, 2020). Although there was much emphasis on formative assessment considered to be an important element of curriculum implementation during COVID-19, there is evidence that assessment is generally used for promotion purposes whilst its formative potentials remain unrealised (DPME, 2017).

## Theorising curriculum implementation

Curriculum theorising is one of the fundamental avenues through which theoretical knowledge is generated in the field of curriculum studies. Curriculum scholars in South Africa have made significant contributions in shaping South Africa's transition into democracy whilst acknowledging the urgency of creating a socially just education system for all (Bertram, 2022). The #Mustfall movement of 2016 in which students call for the decolonisation of the curriculum has demonstrated the insufficiency or the need for scholarly engagement in the theorising of curriculum implementation in South Africa's schools. As explained above, curriculum implementation has stagnated, and it is unable to contribute significantly to the advancement of educational outcomes. A new understanding is required from a curriculum studies perspective, one that is not a mirror reflection of the global north but rather one which considers the diverse context in which the curriculum is being implemented. In other words, one that would shape the post-COVID curriculum implementation discussion in South Africa. At the moment, theorised knowledge about curriculum implementation from the global north seems to be the "go to" approach for all sorts of solutions that affect the unique context of South Africa.

Curriculum implementation in South Africa is understood and influenced from two curriculum studies perspectives: a structuralist perspective and a reconceptualist perspective. The illustrative text of the structuralist perspective *Curriculum: Organising Knowledge for the Classroom* (Hoadley & Jansen, 2009) focuses on the organisation of knowledge based on the concept of performance and competence curriculum. Curriculum inquiry here is about "theorising processes of knowledge production and organisation, or disciplinarity itself" (Parkes, 2018, p. 79). The key concern here is how knowledge is selected and whose knowledge is selected. The implementation of knowledge in this perspective emphasises four interrelated curriculum elements that cumulate to planning for teaching, the purpose for teaching, the designing and organisation of learning activities, and the evaluation progress towards achieving the purpose for teaching. Curriculum implementation in this perspective should be visible and explicitly evaluated and the experiences of learners are not foregrounded although they are important to facilitate learning (Bertram, 2022). The illustrative text of the reconceptualist perspective *Education Studies for Initial Teacher Education* (Ramrathan et al., 2017) focused on an autobiographical, lived, and storied practice as multiple discourses and complicated conversations (Pinar, 2012). Understanding of one's own story through an academic study is at the heart of curriculum inquiry in this perspective. Le Grange (2018, p. 4) criticises the structuralist approach to curriculum by arguing that the "field of curriculum studies in South Africa has been characterised by a focus on banal matters related to the national curriculum: the merits and demerits of outcomes-based education; assessment; classroom pedagogy… [rather than] the concepts internationalising, indigenising, decolonising, and Africanising". The selection of knowledge into the curriculum should reflect contestations and pluralism in knowledge and foreground learners' experiences (Bertram, 2022). The social attributes of knowledge in this perspective should constitute curriculum implementation. To address this theorising challenge facing curriculum studies in South Africa, Blignaut (2020, p. 5) argues that "curriculum and pedagogic change will only succeed if we embrace new ways of viewing knowledge and as well as embracing multiple knowledge traditions". This requires inclusivity and contextualisation of curriculum implementation across the diverse cultural contexts of South Africa.

Whilst these two perspectives have contributed to our understanding of curriculum implementation as an inquiry in curriculum studies, another perspective is needed. One that will not only make use of the two but rather position the context in which the curriculum is being implemented. According to Fomunyam (2021), contextual theorising is key to the relevance of curriculum implementation because it draws the focus of curriculum theorising towards the process leading to the product of curriculum. In understanding the failure of curriculum implementation, Blignaut (2017) pondered why curriculum implementation on a large scale is difficult to achieve in South Africa and realised the contextual short-sightedness of curriculum designers. For Blignaut (2017, p. 1) those responsible for designing the curriculum,

> often think that they only need to produce a technically sound curriculum and announce it to the world and implementation will proceed smoothly. This assumption is even more dangerous when such a curriculum is intended for a society that has been systematically subjected to under development through racial policies.

This highlights inattention of contextual knowledge that comes about as a neglect of teachers' epistemological beliefs, adaptation of curriculum knowledge as opposed to adoption, and their consideration of effective teaching which plays an influential role in their classroom practices. In essence, teachers' professional approach to curriculum implementation should not be limited to knowledge construct or its sociology but how such construct is perceived within the context in which the knowledge is implemented. From neurological sciences, we now understand that there is a relationship between how an individual's learning is integral to the social context in which they find themselves (Baez et al., 2018). This is a move away from the dichotomy of learning theories of behaviourism and constructivism that have underpinned curriculum implementation for decades. A focus on contextual theorising would be a practical solution to contextual problems associated with curriculum implementation. In this case, the work of curriculum studies inquiry is not to seek a universal solution but rather to provide alternative pathways.

## Research methodology

To understand the complexities surrounding curriculum implementation by rural science teachers, our research design ranged from a broad assumption of worldview to selecting detailed methods such as sampling, data generation, analysis, and interpretation (Creswell, 2014). The research design was informed by our desire to understand participants' lived experiences of curriculum implementation and the lessons we could learn. Our work was positioned within the qualitative research tradition, as we relied on a few cases to have rich descriptions of participants' experiences (Creswell, 2014). An interpretivist paradigm was used to understand participants' social reality which cannot exist independently of perceptions, feelings, motives, values, or experiences of a given context (Guba & Lincoln, 1994). Phenomenology was used as our research methodology. We understood it to be a systematic reflection "aimed at people's perceptions of the world in which they live and what it means to them; a focus on people's lived experience" (Langdridge, 2007, p. 4). In this methodology, we were able to understand rural science teachers' lived experiences when they implemented the curriculum during the COVID-19 pandemic.

We purposively hand-picked our participants because the aim of the study required a very specific experience, characterised by being a science teacher in a rural area who implemented the curriculum during the COVID-19 pandemic. Nine (9) participants were purposively selected from the Eastern Cape Province of South Africa, whose rural areas are known for being vast and sparsely populated with similar socioeconomic characteristics. The participants were asked to share their experiences of curriculum implementation during the pandemic. Data saturation was achieved, and additional participants would not have made a significant difference. Ethical procedures were followed in the identification and selection of participants. They were informed about the study's objective, and they voluntarily participated. Each participant took part in one-on-one a semi-structured in-depth interview. This interview technique was appropriate because it generated in-depth data suitable for interpretative phenomenological analysis (IPA) (Smith et al., 2009). The participants preferred to use WhatsApp video telephonic interviews. Due to COVID-19 restrictions, face-to-face interviews were not readily feasible. Each interview took an average of 54 min. Pseudonyms were used for confidentiality and anonymity purposes. The generated data were stored in a safe location. Table 1 is a list of participants' details.

The use of IPA involved segmenting and taking apart the generated data before putting them together to derive meaning (Creswell, 2014). We did this by first categorising the data then coded them to elicit meaning. This stand-alone data analysis method followed a two-stage interpretation process where we analysed how participants tried to make sense of their world and how we tried to make sense of our participants trying to make sense of their world (Smith et al., 2009). For this reason, we allowed our participants to make sense of their world; then we attempted to construct meanings to make sense of the participants' meaning-making processes (Noon, 2018). The themes that emerged are presented next.

**Table 1** Participants involved in the study

| No | Pseudonym | Science subjects | Grades | Years of experience | Gender |
|---|---|---|---|---|---|
| 1 | Sadi | Natural sciences | 9–10 | 11 | Male |
| 2 | Zintle | Natural sciences and mathematics | 9 | 10 | Female |
| 3 | Kwandile | Mathematics and physical sciences | 7 | 24 | Male |
| 4 | Menzi | Natural sciences and technology | 5 | 6 | Male |
| 5 | Lumka | Social sciences | 10–11 | 20 | Female |
| 6 | Mpho | Physical sciences | 6 | 8 | Male |
| 7 | Wandile | Biology | 10 | 10 | Male |
| 8 | Thabo | Natural sciences | 8 | 4 | Female |
| 9 | Lesedi | Biology and mathematics | 10–12 | 6 | Male |

## Findings

In our quest to understand curriculum implementation during the pandemic, we had to get into our participants' world to make sense of their experience. At this point, the participants' experiences were juxtaposed with emotions of fear, uncertainty, hopes, and the willingness to simultaneously overcome the virus and be professional. As teachers, and researchers ourselves, we could relate with our participants' world as we experienced the pandemic within our professional spaces. This made it easier for us to make meaning of our participants' experiences and to reflect on possible lessons learnt that could foster a post-COVID curriculum implementation discourse. The following findings emerged from our analysis.

### Curriculum implementation response to the pandemic

To curb the spread of the pandemic, learner rotation was introduced. This was unprecedented and it had implications on the participants' class size and how they implemented the curriculum. For some participants, the rotation of learners was welcomed as it made their "class size smaller and was a good thing because learners have more attention" (Sadi). The benefits of a reduced class size were not realised by others, "I have 120 learners in my class and even when I divide them into two, I will not have enough social distancing, I'll still struggle to give all learner attention" (Lumka). At some schools there was "no control on when learners are to come to school, there was poor communication between parents and my school" (Zintle). The fear of getting infected was a concern as "some of the learners do not come to class due to the fear of having Covid, some even have family members that had Covid" (Mpho). The experience of these participants highlights problems associated with how schools are managed in rural schools, classroom size, and application of social distancing measures in rural schools (Chisholm et al., 2000; Dube, 2020). The infectious nature of the virus affected how teachers exercised their professional responsibility in an environment that is already struggling with parental involvement and low academic performance (Koopman et al., 2016).

Response to the pandemic created a problem of obliquely affected curriculum implementation in several ways, as identified by the participants. "What I have noticed is that there was also a high level of learner absenteeism when we rotated the learners" (Thabo). Another participant expressed scepticism about the higher-than-usual rate of absenteeism, "I think some of these learners are taking advantage of the situation and decide not to come to school. Their parents do not know when they are to come to school, and they cannot force them" (Wandile). Some participants were concerned about the long-term effect of the use of learner rotation and its implication on learner absenteeism, "I think in the long-term the effect of this rotation is that it encouraged more learners to drop out" (Zintle). At the few schools where remote teaching was tried out, "very few learners attended because they did not either have data or their electronic device is broken" (Sadi). These problems identified by the participants characterise the challenge of curriculum implementation in rural areas (Ojo & Mathabathe, 2021; Taole, 2015). Response to the pandemic appears to have revealed the extent of inequality and aggravated the problem of curriculum implementation in rural areas.

Response to the pandemic also created a problem of repetition of curriculum content. A participant explained that "there was too much repetition of the lessons, we usually do it before but now it's too much" (Lesedi). The reason for this was "the reduced class size to maintain social distancing" (Thabo). Another reason was that "some or most parents were scared to send their children to school" (Menzi). Due to this, teachers had to repeat the same information to different groups of learners and sometimes it was hard to keep track of the learners they were teaching. This is how a participant expressed his exhaustion, "at some point I got confused, I did not know who I was teaching what, these learners come when they feel like it and that affected how I organised my

teaching" (Kwandile). The ATP assisted some participants in organising their teaching although it did not reduce the number of times, they had to repeat themselves. Participants appreciated the guidance from the ATP and explained that "the new ATP had less work and was less complicated than CAPS. There is never enough time to finish the CAPS units but with the ATP, you have a chance to finish" (Sadi). The current construct of CAPS appears to be unsuitable for rural teachers to effectively implement their curriculum as it provides little room for flexibility in the event of any future disruption such as the one experienced during the COVID-19 pandemic.

The government's response illustrates the extent to which the discrepancy between the reality in rural schools and the understanding of policymakers responsible for making curriculum implementation decisions remains unresolved (Blignaut, 2008). It is apparent that curriculum implementation in rural areas can be used as a depiction of South Africa's inequality problem. Government's response and its overall approach to rural education could be considered as one of the reasons that led to more curriculum lost time during the pandemic. The experiences of these participants reveal that curriculum implementation is narrowly conceived in rural areas. This narrow understanding reflects the policy perspective and has unabatedly contributed to inequality in the South African education system. The prescriptive nature of CAPS has made it difficult for teachers to implement the curriculum in a manner that would be suitable to their school context.

## Circumventing subject-related hurdles

Rural schools are noted for their inadequate resources, required to facilitate teaching and learning. The experiences of our participants were generally associated with a feeling of disillusion with the circumstances they found themselves in. The feeling of one participant was that "the department does not care about us, you cannot complain about the same thing for years, now there is COVID-19, it's even worse" (Mpho). Another participant expressed a similar feeling by saying "now I just have to do my best, I look at what the learners need not what we go through during this time" (Menzi). Such feeling of abandonment implicitly influences how teachers adapted to curriculum implementation changes. The experiences of the participants reinforce the notion that science education in rural areas is not given enough attention (Dube, 2020).

Most participants revealed that having practical activities was difficult. A grade 10 biology teacher explained that "my experiments in the laboratory were limited to my classroom demonstrations, learners could not engage with the experiments and had to only watch what I was doing" (Lesedi). Another participant expressed a similar view by saying "I think demonstration alone is not enough learning experience in biology" (Wandile). It is evident that this approach was ineffective in that "learners need to carry out some of the exercises themselves rather than just watch what I'm doing" (Mpho). Also, teaching activities such as "group work was not possible" (Zintle). Other participants were not able to organise outdoor learning in that "we were not able to go for a field trip for example to the reserve bank, with our Grade 12 learners… so I've to rely on pictures demonstration on something they could have seen by going there" (Sadi). Although these challenges might have superficially alluded to the pandemic, the broader challenge associated with curriculum implementation as mooted by the participants remained issues of poor sanitation, insufficient parental involvement, and learner indiscipline (Govender, 2018; Ojo & Mathabathe, 2021). A focus on enhancing the quality of curriculum implementation in rural areas should be understood as a social justice endeavour for the previously disenfranchised. Without much help from the government, these participants will continually struggle to implement a curriculum that is prescriptively designed without adequate recognition of the realities that characterise rural South African schools.

## Dealing with cultural non-recognition

The teaching of sciences in a rural area might require dealing with cultural aspects that are not enacted in the curriculum. These were the experiences of Zintle as she explains how she implements her curriculum:

> I mostly used code-switching, to teach natural science terminology. This is because my learners will not understand when I use English. Even when I repeat the terminology in English many times, they will still want me to say it in their mother tongue (Zintle).

Code-switching appears to facilitate learners' understanding, especially with science subjects that may not necessarily have an equivalent meaning in English. However, an overreliance on it could create a situation of dependence on the mother tongue and might likely affect learners at a higher level of learning. The use of home language seems to be culturally unacceptable when used to refer to human reproductive organs. Participants purposively use English in such circumstances, "I do not use my home language when referring to human reproductive organs. This is because it sounds offensive and rude to the opposite gender … it is culturally frowned upon to teach about the reproductive organ of the opposite gender" (Lesedi). There is a need to incorporate indigenous knowledge into the curriculum, particularly with respect to language because language represents contextual knowledge constructs. This is a concern for the reconceptualist perspective of curriculum studies that

questions hegemonic understanding of knowledge of one group of people and privileges such views in the curriculum (Le Grange, 2018). It is evident that not much has been done to add such views to the curriculum.

Another cultural aspect that is missing in the broader structured curriculum is the non-scheduling of seasonal circumcision (*Ulwaluko*) which clashes with the teaching timetable. "For us, initiation (circumcision of boys) is very important, and we go to the mountains between the months of November and December. Why should the government allow girls to go to school?" (Sadi). The non-alignment of the teaching timetable with this important cultural practice appears to indicate that the education system does not necessarily consider such cultural values in the designing of curriculum implementation.

## Discussion

Our participants' understanding of how they implemented the curriculum during the pandemic was shaped by how they made sense of the government's response and the conditions under which they exercised their professional responsibilities. Their response compounded already existing problems that have exercised constraints on curriculum implementation in rural areas for a long time. Some of these include large classrooms, poor infrastructure, sanitation, indiscipline, learner absenteeism, and violence. More specifically, the participants struggled with organising a (re)scheduled class (Sadi), poor attendance (Lesedi), very large classroom size (Lumka), frequent repetition of curriculum content due to a higher level of learner absenteeism (Zintle), keeping track of teaching based on sporadic learner attendance (Kwandile), and handling cultural expectations in their classroom (Menzi). The poor state of sanitation at these schools and the fear of being infected with the virus meant that curriculum implementation activities of science subjects were compromised. In schools where the level of sanitation was ameliorated, the improved infrastructures were vulnerable to ongoing vandalism. All of these aspects explicitly affected curriculum implementation and contributed to the poor level of academic performance in rural areas as initially found by Koopman et al. (2016). The experiences of these teachers have also demonstrated that rural science teachers struggle with curriculum implementation in general and their struggles were aggravated by the pandemic. These findings are similar to what has been identified by Taole (2015), Dube (2020), and suggested by Maistry (2021) concerning the problems encountered by rural teachers. These problems are reminiscent of the practical issues that have informed several curriculum reforms, yet curriculum implementation reforms have remained undermined (Blignaut, 2017). Addressing the problem of curriculum implementation beyond the pandemic would require a holistic effort that would involve not only the provision of resources and the training of teachers but also a rethink of what it means to implement the curriculum in a rural area as opposed to curriculum implementation in an urban or semi-urban school with adequate resources.

There has been much work done in the curriculum to address the challenge of inclusivity, particularly in terms of access to school. However, there is an indication in this study that more is needed regarding cultural inclusivity of all social groups. The constructs of CAPS with specific learning units and outcomes do not afford teachers in rural areas enough flexibility to provide the required cultural transition when they implement the curriculum. Much of what is being done is limited to the translation of words without an underpinning of epistemological meaning that has constructed the knowledge being taught. Creating such an opportunity in the curriculum would assist teachers to map out an avenue through which plurality of knowledge can be enacted in the curriculum (Le Grange, 2018).

For far too long the problem of poor learner performance has entirely been blamed on schools and teachers without an equivalent introspection on how a one-size-fits-all approach to curriculum implementation has contributed to inequality in South African schooling (Blignaut, 2008; Soudien, 2015). The pandemic has demonstrated the ineffectiveness of policy designers to understand rural realities in the designing of curriculum implementation. Much of what is conceived in the curriculum is suitable for implementation in school contexts where there are sufficient resources to support curriculum implementation. This is a systemic problem and teacher education programmes at universities appear to reflect this view where pre-service teachers are being trained to be resource dependent as an element of effective teaching. This accounts for why rural science teachers struggle to mitigate the prescriptive construct of CAPS, as the privileged views of the designers (Le Grange, 2007) determined how the curriculum would be implemented before and during the pandemic. This study also reveals that due to the construct of CAPS, rural teachers comply with what is expected of them. The current circumstances of these teachers have not changed from Blignaut's (2007) finding that teachers adapt to curriculum implementation expectations rather than adopting it through their epistemology.

From a theorising point of view, inequality in South African's education system cannot be addressed from the structuralist perspective of curriculum studies. There is a need to initiate a post-COVID curriculum implementation reform through which a reconceptualist perspective of curriculum studies plays a more prominent role in curriculum implementation. This is particularly because the reconceptualist perspective draws on issues of knowledge plurality, indigeneity, communities, and decolonisation. These theoretical perspectives would afford rural teachers, communities, and

parents to tell their stories and participate in the complicated conversation of what an enacted curriculum ought to be for them. This study shows that contextual curriculum theorising can be one of the avenues that would assist in mitigating the shortfall of curriculum implementation. Historical considerations in the current approach to curriculum implementation revealed western domination of Eurocentric epistemologies which have constructed the grand narrative present in the current curriculum implementation approach (Weenie, 2008). This universalised western dominated knowledge credence still informs South Africa's approach to curriculum implementation. As a way forward to effectively enact notions of contextual curriculum, there is a need for more research to be done on how a contextual curriculum can address the specific needs of curriculum implementation for a diverse context such as South Africa.

## Conclusion

We have in this article explored curriculum implementation in South Africa and how the COVID-19 pandemic could help us address the challenges associated with curriculum implementation. This challenge has relatively remained unchanged and unaddressed irrespective of several curriculum reforms that have taken place post-1994. Curriculum implementation is considered one of the reasons for inequalities in South African schools and an important element that contributes to the current poor education system. Key to our research was to understand how science teachers in rural areas implemented the curriculum during the COVID-19 pandemic and what lessons can be learnt from their experience to foster the curriculum implementation discussion in South Africa. Our findings revealed that the government's response to the pandemic appeared to overlook already existing fundamental problems associated with curriculum implementation in rural areas. These problems were exacerbated during the pandemic, as the one-size-fits-all notion of curriculum implementation was indiscriminately used to respond to the pandemic. In this study, we learnt that curriculum implementation is narrowly conceived as an aspect of classroom pedagogic exercise irrespective of context and it was not necessarily understood as a totality of teaching and learning that involves teachers, learners, parents, and community members. This narrow understanding is concerning, especially because the designing of CAPS requires take-home activities as an integral component of teaching and learning. This understanding of curriculum implementation has unfortunately accounted for the disparity of learner performance and has come to characterise inequality in South African schools. The implications of our findings pinpoint the need for curriculum implementation reforms in South Africa. Such reform should draw on the tenets of contextual curriculum theorising and include the experiences of rural science teachers. Previous curriculum reforms have predominantly focused on addressing policy-making processes, curriculum structures, and content whilst issues on curriculum implementation have largely been taken for granted. It is also our hope that this article will initiate and foster a post-COVID-19 curriculum studies conversation on the scholarship around curriculum implementation in South Africa and rural schools across the world.

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**Data Availability** The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

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