

Exploring Educators' Perceptions of the Impact of Poor Infrastructure on Learning and Teaching in Rural South African Schools

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Abstract

The purpose of this research study was to explore the views of rural mathematics and science schools' educators about the impact of poor infrastructure in their work environment. Participants were seven educators whose ages ranged between 25 years and 50 years ($M = 35.0$ years, $SD = 9.4$). Data were collected through one-on-one interviews. The results show that educators identified a number of issues that they felt play a role in the learning and teaching context. In many respects, the educators painted a bleak picture in respect of poor infrastructure provisioning and the proper functioning of their schools. It is argued that there is an urgent need to address the participants' concerns. Furthermore, that government should provide proper and adequate school infrastructure wherein classrooms, laboratories and libraries are equipped to lead to favourable learning experiences.

1. Introduction

A Google search in May 2013 about conditions and infrastructure in rural schools in South Africa produced banner headlines from newspapers, such as:

A school journey into Eastern Cape's darkest heart (de Waal 2013)

Forgotten schools of the Eastern Cape left to rot (John 2013)

Schools to be fixed (Nkonkobe 2013)

Technology in rural schools is not a magic bullet, but it is a good start (Wild 2013)

All these banners typified the appalling conditions in rural schools. Accompanying the banner headlines have been pictures that provide a visual impact of the conditions (see Figure 1 and Figure 2). It should be mentioned that the two pictures including the accompanying captions were obtained and adapted from The Bulungula Incubator (2013). One picture was however blurred because it is the conditions and not the faces of the people in the picture that are illustrated.



No teacher, no lessons.....

Figure 1. An illustration of a rural school classroom with no teacher in charge



Shameful conditions

Figure 2. An illustration of a rural school classroom with no facilities

In spite of the remarkable changes in South Africa since the new dispensation in 1994, education is still confronted with major problems in many rural schools. In South Africa, one undeniable fact is that the education system has always been beset by infrastructural shortages and problems. In fact, in September 2000 the Minister of Education indicated that backlogs would be eliminated by 2008. It should be pointed out though that the Minister did indicate that the cost to improve classroom infrastructure in order to enhance the quality of education in rural schools would be enormous at R12 billion (approximately \$1.5 billion). The cost has indeed proven to be inhibitive because rural parts of provinces such as the Eastern Cape, KwaZulu-Natal and Limpopo 18 years into democratic rule had not experienced any major infrastructural development as acknowledged by the Republic of South Africa Department of Education [RSA DoE] (2009). To its credit, the RSA DoE focused on increasing the pace of infrastructure delivery, improving infrastructure-planning capacity and financial management, and developing human resource capacity in schools. This may be seen from the fact that the post-apartheid South African government has initiated policies aimed at improving the educational performance of both the educators and learners (Mabogoane & Pateli 2006). Poor classroom infrastructure development though remains a problem especially in the provinces referred to here.

The problems related to infrastructural development were inherited from the apartheid era. In that system, all developmental issues related to African people in particular were either minimal or non-existent in many areas of life. This means that those who were in rural areas, including schooling, were even more neglected by that system. In fact it is pointed out that most problems experienced in historically disadvantaged schools in South Africa are traceable to the apartheid system (Singh & Manser 2002). Furthermore, the RSA DoE (2004) too has lamented the fact that apartheid denied many citizens access to opportunities to gain information, skills and experience necessary to develop and equip them to contribute towards economic growth. The denial of opportunities arose because of racial segregation accompanied by unequal distribution of resources in favour of whites (RSA DoE 2004). It is acknowledged that during the apartheid era, schooling and related issues did contribute to whites unfairly advancing economically to the detriment of other races in South Africa (Kallaway 1984; Ndimande 2009).

Infrastructure is an integral component of the learning and teaching context. This is because a school's infrastructure enables students and teachers to access a wide range of tools, services and resources to support learning and teaching. For instance information technology through the use of computers could be useful for teaching, learning and administrative purposes. However, lack of electricity for instance renders the virtues of information technology useless in such a context. The lack of resources is a critical factor in education because it may negatively affect the learning and teaching processes within the classroom. It is reported on the one hand, that lack of facilities and under-resourced schools are directly associated with the academic failure of learners (Lolwana 2004). On the other hand, factors militating against rural learners' academic success have been identified as poor infrastructure, poverty, and lack of supportive academic discourse (Banda & Kirunda 2005). To illustrate how the physical environment affects learning it is argued that while infrastructure backlogs of classrooms may be addressed, if sanitation meanwhile is not catered for, then learning and teaching problems will still persist (Dryden & Vos 2005). In a related manner, it is pointed out that the realities of rural life related to poverty, lack of basic facilities and infrastructure in schools also play a negative role in attracting suitably qualified teachers (Mabogoane & Pateli 2006).

A number of factors impact on rural learners' school performance. Among these, we can highlight the experiences of teachers as well as the role played by the parents. It is opined that rural teachers have to work in conditions with fewer resources and have less control over the curriculum, which eventually leads to frustration (Collier 2005). This situation

means that learning may rely solely on what the teachers tell learners. As a result, the learners are left extremely disadvantaged because they remain ignorant of everything they are not directly told (Collier 2005). With no media centres and internet connections, learners in these rural schools have very little opportunity to discover ideas and information for themselves. It is argued actually that rural learners lack access to artefacts, the availability of which could have exposed them to necessary information useful in developing their self-expression (Banda & Kirunda 2005). About resourced classrooms on the other hand, it is opined that suitable and well maintained buildings have a direct bearing on effective learning and teaching (Kruger 1999). This essentially means that a positive and conducive classroom atmosphere has significant and direct influence on the performance of teachers and learners. Most importantly, Kruger (1999) points out that in a school context both human resources and physical structures reflect the priorities, values and its philosophy.

Furthermore, in many instances suitably qualified teachers are lured to more resourced schools. This may be because there are no incentives to keep them working in rural schools. So when work opportunities avail themselves in more resourced areas they invariably leave. The unavailability of suitably qualified teachers may have its ramifications. Firstly, it may result in learners being taught subjects like mathematics and science by individuals who have no experience in teaching these. Secondly, this impacts negatively on learning, which may result in learners performing badly in these subjects. Thirdly, students may lose confidence in the schooling system and dropout. A problem here is that students who dropout from school may encourage others to think about leaving school too. In fact, in the US it is reported that "... the main determinants of dropping out are very similar across rural and urban areas, we do find that some location and peer attributes play different roles in urban and rural areas" (Jordan, Kostandini, & Mykerezi, 2012, p. 19).

Parents too play a critical role in the educational context because they provide moral, financial and emotional support to their children. In this regard, studies (for example, Hanushek & Woessmann 2010, p. 14) have reported a "... strong associations of educational achievement with many measures of student and family background." In instances where parents are not educated however, the support is not guaranteed. In poverty stricken rural areas one finds that most parents are also generally uneducated or have little formal education. With little formal education, a majority of parents invariably do not engage in reading and writing activities. Furthermore, such a situation means that learners grow in an environment in which there are no books to read. The absence of books at home is extremely disadvantageous because it has long been argued that the number of books in a home is an important predictor of academic achievement (Milne Myers, Rosenthal, & Ginsburg, 1986; Downey 1994). This is an important issue because it is shown that children who have had early reading experiences with their parents benefit in formal instruction and they have a distinct advantage over their peers (Wade & Moore 2000).

In fairness, the problems outlined here notwithstanding, there have been disadvantaged remote rural schools that have achieved a 100 % pass rate in matric (Singh & Manser 2002; Balanskat 2003). Similarly, Surty (2011, p. 14) in citing two excelling schools from Limpopo after the release of matric results indicated "... they produced no less than 40 distinctions in Mathematics and Science last year." There are a number of reasons for this success, with some good and other questionable. For instance, in some schools everyone involved in matric works overtime including weekends and holidays. In other schools though, a system known as 'gatekeeping' is followed whereby pupils in Grade 11 deemed to be weak are deliberately held back from progressing into matric (Govenda 2010). What has been shown here though is the fact that infrastructure provision and well-maintained infrastructure systems appear to be an imperative or an essential ingredient for improved schooling results. That is, infrastructure plays a significant role in schooling in general.

2. The Problem

The lack of infrastructure and facilities as indicated here has had a bad effect on learning and teaching in the rural areas of South Africa. A resultant effect of this bad situation is that inequalities are deeply rooted in the education system, and rural schools reflect this more than any other. The situation renders teaching and learning extremely difficult in rural schools. As a result rural schools fail to meet national goals in terms of providing unfettered access to quality education. The worse thing about poor performance at school is that it creates a vicious 'cycle of despair' (see Figure 3). The cycle of despair is purely based on our reading of the situation and we endeavour to explain it here in as simplistic a way as possible. Firstly, by being educated it means that individuals acquire knowledge which they use to create goods and services and thereby improve the economy of the country. Secondly, by being educated and with improvements in the economy then individuals get good employment which alleviates poverty.

We have addressed and explained this from a positive perspective; the corollary is that without resources at schools children perform poorly. The situation leaves them without good education; they do not get good employment and poverty prevails. The aim of this study therefore was to explore high school science educators' perceptions of the impact

of poor infrastructure provisioning on learning and teaching in schools where they teach. Science educators were selected because it has been argued that for South Africa to advance technologically, a mathematically and scientifically literate society is *sine qua non* (Mji and Makgato 1996). Such a society is important because without scientific knowhow the general economic outlook of the country may not be good. Also, in order to produce a mathematically and scientifically literate society then infrastructure provisioning in schools should proportionately be of high quality too.

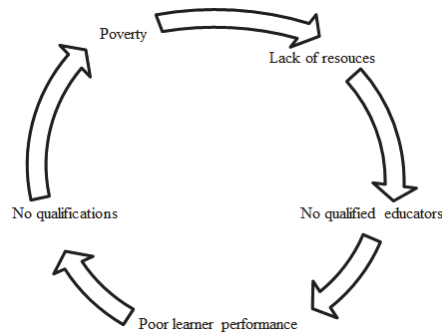


Figure 3. The cycle of despair

3. Study Site

This study was conducted in a rural district in Northern Kwa-Zulu Natal where the first author also works. This in a sense means that he has first-hand knowledge of what goes on in this area's rural schools. The schools here are exclusively dominated by Zulu speaking learners. The rate of illiteracy is high with most parents or guardians either unemployed or working in low paying local farms. Schools in this part of the district may be classified as extremely poor. Most are built using mud rather than brick and mortar as is generally the case in more affluent areas. Essentially, all one gets are four walls which may or may not have windows and in some cases even doors. This situation means that schools do not have fully equipped classrooms, laboratories or libraries. In almost all instances play grounds and sport facilities are non-existent. In fact these are usually luxuries these schools simply cannot afford. What this situation illustrates is that rural schools at the study site are poorly resourced. Compounding this situation is the fact that learners generally perform poorly at these schools. In fact, the unavailability of school laboratories, books and other resources has meant that matric results (Grade 12) have not been good for a number of years. In 2007 a national newspaper lamenting the matric pass rate in KwaZulu-Natal rural schools, indicated "... little is being done to change this situation resulting in Grade 12 results deteriorating every year ..." (Sunday Times, 2007).

4. Method

In describing the methods employed in this study firstly the research question is outlined. This is followed by a description of the participants. Finally, an account of how the data were collected is provided.

4.1 Research question

So far the prevailing context within rural schools has been sketched. The main question of this study therefore is: *What are science educators' views about the impact of poor infrastructure provisioning in their schools?* To answer this question, five sub-questions were used in one-on-one interviews with the participants. The sub-questions were: (i) *Which key resources need urgent attention at your school?* (ii) *Apart from the facilities you mentioned earlier, which other facilities are lacking in your school?* (iii) *What would you say is the most important issue that affects student learning within the classroom?* (iv) *In what way does infrastructure provisioning affect the retention of qualified educators?* and (v) *At this point what springs to your mind that you feel we could have asked you? Or you would like to mention?*

4.2 Participants and procedure

4.2.1 Sample

In the study site there are approximately 20 schools. On average there were two educators teaching Grade 12 mathematics or physical science in a school. For logistical reasons, such as the ability to access all educators and transport costs the intention was to interview 10 (40%) of the population. The teachers were purposefully selected because they taught Grade 12 mathematics or physical science in their schools. We however could not get three participants to be interviewed on appointed dates. So in this qualitative study, the interviews were conducted with seven teachers. Four of the teachers were principals. The principals especially were also chosen because in many ways they are the accounting officers within the school system.

4.2.2 Instrument and procedure

Data were collected by means of open ended interviews. The aim of the interviews was to give an independent voice to the participants. In particular each participant was encouraged to provide as honest a view as they felt was applicable to them. In collecting the data we ensured that we visited the participants in their schools. In doing this, we were mindful of the argument that a researcher has to go to the setting of the study because if participants are removed from their setting, it may lead to contrived findings that are out of context (Cresswell 1998).

5. Results

Here, an analysis of the collected data, its interpretation as well as the findings from the participants' perspective is provided. In particular, participants' views on the impact of poor classroom infrastructure in their schools are outlined. Their views were coded into themes or categories with the aim of deriving meaning from these. The themes were labelled using *in vivo* coding. This means that responses that were judged to convey the same or similar views were grouped together. Importantly, actual words or phrases used by the participants were then used to name the emerging themes in this study.

5.1 Participants' Biographical Information

Table 1. Biographical data of the sample (N = 7)

	Category	N	%
Gender	Women	2	28.6
	Men	5	71.4
Age	20 – 39	3	42.9
	40 +	4	57.1
Highest academic qualification	Grade 12	2	28.6
	Diploma (e.g. Diploma in primary education)	3	42.8
	Degree or higher (e.g. B.Ed. or B. Ed. Honours)	2	28.6
Teaching experience (years)	0 – 9	3	42.8
	10 or more	4	57.2

The participants were four principals and three educators, five (71%) of whom were men. Their ages ranged between 25 years and 50 years ($M = 35.0$ years, $SD = 9.4$). Most (71%) had a highest qualification of a matric certificate or a teaching diploma. While 4 (57%) made up of one woman and three men had teaching experience of 10 years or more. The rest of the biographical information is shown in Table 1.

5.2 Participants' Views

Here, pseudonyms are used for all the seven participants. The participants are referred to as: Ms Mbatha, Ms Mdletshe, Mr Khuzwayo, Mr Ngobese, Mr Ngubane, Mr Zulu and Mr Zungu. To the first question: *Which key resources need urgent attention at your school?* The participants identified: (a) school buildings; (b) human resources; as well as (c) information and communication technology (ICT). This theme was referred to as: *Key resources*. What follows next are excerpts of what participants identified as key resources needing attention.

Regarding school buildings, the unavailability of offices and the state of the buildings were the most identified problems. This issue is illustrated by Mr Zungu, a principal, who said that he does not "... have an administrative block." He indicated that he shares "... a classroom with the administrative clerk". What this illustrates is the fact that there is no practical administrative working space for him. Similarly, Mr Khuzwayo also a principal said that in his case, the "... school buildings are made of mud and some are in a state of disrepair." He wondered about the maintenance of buildings and he asked "... who is going to collect mud and plaster these buildings?" In most schools we also observed that one or so windows were broken and a few door knobs were missing.

Also, the participants also identified human resources as a matter that needed urgent attention. Lack of human resource affects the provision of quality education in rural schools. For example, Ms Mbatha an educator mentioned that "... lack of human resource impacts negatively in the provision of quality education in my school." In addition, another educator Mr Ngobese said, "... I have high rate of unqualified and under-qualified educators. This leads to some subjects handled by educators that do not have required professional knowledge and skills. For example, subjects like Mathematics, Physical Science and computer studies are taught by unqualified and under-qualified educators." Indeed we were told that some educators were on temporal appointments. This in fact is a sentiment also expressed by another principal, Ms Mdletshe, who said "... learning and teaching especially in the core subjects like mathematics gets affected because some of the teachers are on temporal appointment ..." When asked in what way temporal appointments affected learning and teaching, she responded with a tautological question "... if you were working under a cloud of not knowing whether you would still be working tomorrow do you think you would be committed to the teaching cause ...?"

With regards to ICT, all the participants' schools did not possess enabling facilities such as computers, iPads or mobile telephony with attendant connectivity. In this regard, Mr Zulu (an educator), indicated that "... we have never had computers of our own in this school ..." When probed about what they do then, he said, "We would like our learners to use computers and especially the internet ... due to poverty, learners are unable to travel to urban areas where they can access necessary information on the Internet." On the other hand, Ms Mdletshe argued that the absence of computing facilities was a disadvantage for rural learners. About this issue, she argued that "... our learners are compromised because we do not have computers ... This means that they don't have all the resources to complete assignments compared to children from schools that have these ..." It was interesting to find out how computer literate the participants were. This was because not one of them mentioned their computer literacy status. When asked about this, all indicated that they could use computers. In fact, they indicated that they attended different workshops addressing a number of aspects relating to the improvement of qualifications, computer literacy, and curriculum development. Perhaps the participants' computer literacy was exemplified by the two women. Ms Mdletshe said, "... computers assist educators to develop skills and knowledge they need as lifelong learners to achieve personal goals and to be full participants in the global community." Further, she pointed out "... ICT enables educators and learners to gain easy access to learning and teaching materials online without time constraints. It also assists educators to interact with their colleagues all over the world for mutual support and development." In a related manner Ms Mbatha indicated, "... I feel comfortable to work in conditions that are technologically favourable."

Over and above the three identified themes, all the participants indicated that they had a problem with the provision of infrastructure. For example, Ms Mdletshe indicated that "... the Department of Education is responsible for the provision of infrastructure in schools." Mr Zulu, expressing his disappointment, said "... my school had to wait for its turn to receive desks and chairs. The waiting period could not be predicted." We then told that in certain instances schools waited for up to periods of more than 10 years.

In the second interview question, participants were asked: *Apart from the facilities you mentioned earlier, which other facilities are lacking in your school?* Here only one theme emerged and it related to *Lack of sanitation*. All the participants indicated that they had a problem with the lack of sanitation in their schools. Like classrooms, a shortage of toilets in rural schools was identified. Not only were there few toilets those that were there we not waterborne but pit latrines. This also means that there were no sinks for washing hands. For instance, Ms Mbatha indicated "... there are only two pit toilets for learners in this school. ... Can you imagine a school with more than 500 children and they only have two toilets?" Also, she pointed out "... For us, you have to walk a long distance to neighbouring homes to use a toilet

... think about it, what happens all this time you are gone?" Mr Ngubane voiced his concern about the conditions of the toilets which need consistent maintenance. He said "... we cannot trust how healthy our school's environment is because there is no running water which makes it impossible to meet sanitary requirements." On the same view, Mr Zulu argued, "... every school must have elements that make the environment healthy. He also argued that "... sufficient numbers of toilets will decrease health concerns." Also, Mr Ngubane expressing a similar view as articulated by Mr Zulu said, "... I think if sanitary requirements are lacking the school will certainly be affected ..." Asked in what way, he said "... what do you think will happen if there is a diarrhoea outbreak among learners for instance, ... it will be a crisis ... that's all."

The third question participants responded to was: *What would you say is the most important issue that affects student learning within the classroom?* It was explained to the respondents that their responses should not be related to issues like the state of the classrooms as this was already addressed. All viewed classroom overcrowding as the main contributor to poor performance of learners in their schools. This theme therefore was referred to as: *Classroom overcrowding*. In this regard, participants indicated that classrooms were sometimes so full that it was not easy even to walk around to observed learners when doing their work. This situation means that slow learners or those with learning difficulties may be deprived of the opportunity to be attended individually. About this matter Mr Khuzwayo said, "... overcrowding results in neglect of all learners especially slow learners." Some educators felt that this was also not hygienic because if any learner had flu or any contagious infection then others were likely to be affected which impacts on learning. Regarding hygiene, Ms Mbatha said "... one day about half of the learners in my classroom were absent ... I found out that all were coughing and they went to the clinic ... I think this was because of the overcrowding because one learner was coughing the previous day." The participants also indicated that writing tests and examinations was a problem in overcrowded classrooms. Mr Zulu in fact pointed out that "When children write tests they must seat in free space with their question papers, pens, rulers, everything ... in our classrooms this is not possible ... That is why you find some learners copy from others" classroom overcrowding was easy to observe in the participating rural schools. In fact, in some schools we saw learners even sharing a chair. Also, in some instances four learners would be seating in a desk that ideally should accommodate two. Furthermore, we observed that on average some classrooms had more than 80 learners.

The fourth question participants responded to was: *In what way does infrastructure provisioning affect the retention of qualified educators?* All the participants viewed teacher qualifications as a contributing factor in learning and teaching. Qualifications pose a problem in rural schools where some educators are under-qualified to teach. Ms Mdletshe for instance revealed that she has two unqualified educators who have only attained Grade 12. She said "... what can they really teach? ... after all they are not trained to ..." Ms Mbatha added that "... the problem of unqualified educators makes the execution of duties to be burdensome ..." On the other hand, Mr Ngubane confessed that he has to guide, mentor, orientate and support the unqualified educators to enable them to perform their core duties.

Table 2. Number of educators from schools in the two wards in the district together with their qualifications

Ward	No. of educators	Qualified	Un/under-qualified
1.	350	200	150
2.	298	140	158
Total	648	340	308

Information relating to educator qualifications was obtained from the district office for all the schools in the area. Table 2 shows the number of educators from schools in the two wards in the district in which this study was undertaken together with their qualifications. The table shows that about half (47.5%) the educators were either unqualified or under-qualified.

Finally, we asked the participants: *At this point what springs to your mind that you feel we could have asked you? Or you would like to mention?* Here two themes emerged. The first related to the availability of textbooks, the library and laboratories. This theme was referred to as: *Availability of libraries and laboratories*. The second theme on the main was about: (a) parental participation; (b) learner absenteeism; and (c) supervision of homework. This theme was referred to as: *Parental involvement*. Participants identified the availability of textbooks as something that affects effective teaching. Included in this was the lack of library facilities within the schools. Expressing his frustration, Mr Zulu said: "... money allocated for books and stationery is insufficient ... It does not cover individual learners' needs ..." According to him, he would prefer that all grade levels had sufficient textbooks especially for learners in Grade 12. About this he said "...I have to order new books every year ... Can you believe this? ... Every year my learners have to share the textbooks because I am never given the number I ordered ..." About libraries all the educators indicated that it was not possible for them to have these in their schools. When asked why it was not possible to have libraries, the common theme was 'space'. For

instance Mr Zondi said: "... I don't have a library in my school ... It is unfortunate that our learners write the same papers with learners who are exposed to all learner support materials ... My school is not adequately equipped for learners to perform as envisaged." Here, he clarified that he was referring to Grade 12 examination results that most schools tend to be judged by in South Africa.

Perhaps the common theme was well encapsulated by Ms Mbatha who said "... we do not have enough classrooms in good order ... don't you think a library would be a luxury? ... We just put the few books we have in shelves at the back of the staff room ..." The unavailability of textbooks was easy to observe in most participating rural schools. In fact, in some schools we saw pairs of learners sharing a book. Also, in some instances learners would be seating attentively listening to the educator with no textbooks in front of them. Also, the participants highlighted problems related to the unavailability of laboratories in their schools. They identified the unavailability of laboratories to have a major influence on effective teaching and learning. Expressing his disappointment with regards to laboratories, Mr Ngobese pointed out "... there is no laboratory in my school ... We should have at least one laboratory ... It should be fully equipped with instruments and chemicals ... Absolutely, there is no room for conducting experiments As a result, we stick to the old method of teaching ... Instead of being hands-on when doing practicals ... we and learners rely on the information from the textbook." Expressing his concern and sharing similar views, Mr Zulu said "... lessons of science in my school are traditional." When asked why they are traditional, he gave a number of reasons "... The actual teaching is teacher-centred ... There is no way to show learners anything or prove scientific problems ... the method of teaching is just using the textbook." According to him the unavailability of a laboratory limits him, "... from ever showing my learners some of the experiments recommended in the textbook I use."

When enquiring about the storage areas for science equipment and chemicals, our observations confirmed that all the rural schools had no laboratories as indicated by the educators. In one school we observed a box in a corner of a Grade 12 science stream classroom labelled 'science equipment.' When we opened the box we found that it contained a number of beakers and test tubes that looked new. In the box there were also a few vials of chemicals such a potassium sulphate and calcium carbonate but the markings on them indicated that these were 5 years old although they appeared new. With regards to parents, the participants identified parental involvement and participation to be hindering school activities and their children's performance in general. This issue was illustrated by Mr Zulu who said: "... parents do not attend meetings." When asked what makes them fail to attend meetings, perhaps expressing his frustration, he said "... It is because of inferiority complex displayed during parents' meetings ... My school is in the area where the majority of parents are illiterate ... In this regard, there is absolutely no involvement by them ... It just is very difficult to involve parents regarding school matters." Mr Zungu on the other hand, insisted "... parental non-participation hinder the normal functioning of the school." To verify Mr Zulu's assertion, I discovered from the attendance register of meetings that due to non-attendance by parents, meetings had to be rescheduled. I also found that the reschedules did not work because a majority of meetings were eventually held without them anyway.

About the parents and their children's performance Mr Zulu asked: "If they are not involved in school activities for the reasons I have already mentioned, how then can one expect them to help their children with school work? ... Surely they can't ... they simply can't." This is a view Ms Mbatha also alluded to when she said "I will tell you this, I have asked my learners how they are helped by their parents with their school work ... I wish you could have seen their surprised faces ... anyway all virtually said parents had nothing to do with school in any form ..." Absenteeism was also identified as a contributory factor that leads to learners' poor performance. This behaviour was seen to be mainly due to two factors. The first was linked to parental involvement. The second on the other hand, was related to the social circumstances of the learners. For example, Mr Khuzwayo when referring to this issue said, "... there is a high rate of learner absenteeism in this school." I asked him what he thought was the reason for this? He replied, "Two reasons ... One, some children run households, they have younger siblings to look after ... Two, some parents will give their children chores and never even report to the school that the learner will be absent ... quiet, nothing ..." I then asked him whether he thought it was intentional from the parents' perspective. To which he answered "... most want their children to be educated but I think illiteracy is a problem because when they don't come to school they see nothing wrong ..." The assertion relating to running households was repeated by Ms Mdletshe who said "... instead of coming to school, learners look after young ones when they are ill ..." Ms Mbatha on the same issue averred "learners usually go to the department of social development to either receive grants or to apply for the social grants ..." I requested to view attendance registers for the different grades at Mr Zungu's school. I observed that indeed some learners were frequently absent from school.

The rural school participants identified lack of homework supervision as a contributory factor to learners' poor performance. Regarding this matter Ms Mbatha said, "... a high percentage of learners come to school not having done their homework ... Unfortunately, the learning process gets affected ... I am sorry but this impact negatively on learners' performance." I asked her in what way this impacted negatively. She replied, "First of all it means students do not

continue practicing what they were taught on a particular day ... Secondly, one wastes time the next day repeating things they could have practiced. All the time you give them mathematics homework it will be perfectly done with all solutions correct in the books ... now ask the usual suspects to show and explain how they did the calculations then you realise only one or two actually tried while the rest ... (shaking her head) shame." As had already been pointed out, lack of homework supervision was attributed to high illiteracy levels amongst the parents. Mr Zungu simply said, "What can we do? We try to impress on the parents about the importance of their children doing given homework ... we report to parents that homework is never done and nothing ever changes." Similarly, Mr Ngubane argued, "... learners come to school not having done their homework." When asked what reasons they provide for failing to do their homework, he said "... the main reason is that there is no one helping them at home ... There is no supervision of school work at all ... to be honest it is difficult to blame the poor parents because they are not educated so you can't expect them to be magicians." We looked at homework books of some learners and noticed that mostly the work was done perfectly. We also had occasion to watch learners working out problems given the previous day as homework. It was unbelievable to look at a learner's book with the correct answer while they simply could not move on the chalkboard, in a way corroborating Ms Mbata's assertions.

6. Discussion

The purpose of this study was to explore high school science educators' perceptions of the impact of poor infrastructure provisioning in their schools. Essentially, the educators painted a bleak picture in respect of poor infrastructure provisioning and the proper functioning of their schools. For instance a principal pointed out "... school buildings are made of mud and some are in a state of disrepair." While another averred "... our learners are compromised because we do not have computers ... This means that they don't have all the resources to complete assignments compared to children from schools that have these ..." The issues raised by the participants in this study are critical because school buildings are identified to play a role in learners' performance and wellbeing. For example, it is argued that "... the interrelationship between school buildings and the level of students' scholarly performances has been the topic of studies ... for a number of years" (Knapp, Noschis, & Pasalar, 2007, p. 5). If for instance school buildings are not in good shape then they may pose a danger to both learners and educators that may affect the teaching and learning process. This is important because it is argued that the physical environment a school maintains is an important aspect in promoting good health, safety, and a beneficial learning environment among learners (Jones, Brener, & McManus, 2003). For example in situations where there are no windows, in winter this may result in learners and educators feeling cold and falling ill with ailments like flu and pneumonia. These ailments may then result in high levels of absenteeism in a school.

Studies have also reported on the impact of the school resources on learner achievement. For instance, Uline and Tschannen-Moran (2008, p. 55) indicate, "... results confirmed the hypothesis that school climate plays a mediating role in the relationship between facility quality and student achievement." Considering that the rural schools in this study did not have quality facilities then it should be expected that this would impact negatively on learners' performance. In this study the rural schools participants referred to the high rate of unqualified and under-qualified educators. Educators who are not suitably qualified are not ideal in the teaching and learning context because they leave learners with gaps in knowledge. In this regard it is argued that professionally qualified, conscientious and dedicated educators are essential if the goals and objectives of education are to be achieved (Articles, 2013). There are many reasons why rural schools especially experience the lack of qualified educators. Amenities in rural schools may be a problem in terms of recruitment. Also, the very profession is not highly regarded by society which makes it difficult for suitably qualified educators to sacrifice everything and go and work in rural areas. About this issue it is further argued that "... the problem of underqualified teachers, like related problems with working conditions, recruitment, and retention in teaching, can be traced to a common root: the low stature and social standing of the teaching occupation" (Ingersoll, 2005).

Regarding the importance of ICT it is pointed out that "... the role of educational technology should be to replace classroom discourse patterns with those having more immediate and natural extensions to knowledge-building communities ..." (Scardamalia & Bereiter, 1994, p. 265). In this study's context ICT was non-existent in rural schools, which means that Scardamalia and Bereiter's contention is impossible to achieve. Lack of sanitation in rural schools was also identified as a factor that impacted on schooling. It is argued that a clean and healthy environment in schools is a fundamental human right "... however, thousands of children are being denied to their basic right as they have no or very limited access to clean and healthy sanitation facilities in their schools, especially located in rural areas" (Murtaza, 2012). This is also a finding of this study among the rural schools. So this implies that the learners and their educators were denied their fundamental human rights. An important aspect about the lack of sanitation in schools is that it may bring a threat of diseases. When there is no water, learners after using toilets do not get a chance to wash their hands for

instance. About this issue, it is reported from a Zimbabwe rural schools perspective for example that lack of access to water and sanitation had the risk of leading to learners developing illnesses and missing school (Dube & January, 2012).

Overcrowding was also identified as an important factor. Overcrowded classrooms are a problem because it is difficult for educators to oversee what learners are doing at any one time. In fact, about overcrowded classrooms Mr Khuzwayo indicated that the resultant effect of this was neglect especially for slow learners. A disadvantage of slow learners who do not receive due attention is that they will not feel they are in a caring environment. More so, such learners may even doubt their competencies. About these issues Collier (2005, p. 355) points out that a caring environment "... allows learners to develop a sense of their own competency." Furthermore there is reference to an 'educator's caring model' in literature. In fact Collier (2005, p. 355) argues that the caring model "... assists educators to help learners to achieve their goals and break the cycle of insecurity. These goals can only be reached when learners are equipped with social skills, positive self-esteem, a strong knowledge base, nurturing and support" (Collier, 2005, p. 355). When classrooms are overcrowded such a model may be extremely difficult to attain.

With respect to the retention of qualified educators, the participants' focus was more on unqualified educators. For instance, Ms Mdletshe referring to two unqualified educators in her school, said "... what can they really teach? ... after all they are not trained to ...". A major problem with unqualified or under-qualified educators is that they find themselves teaching subjects they don't have competence in. This may impact negatively in learners' understanding of and performance in such subjects. This is a concern that has been identified in other countries too. For instance in Britain it is reported that "[A]n average of more than 20 pupils are currently taught in each secondary school classroom, meaning hundreds of thousands of children are likely to be in lessons led by 'under-qualified' staff everyday" (Paton, 2012). Similarly in the US, Ingersoll (1999, p. 26) points out that:

...a third of all secondary school teachers of mathematics have neither a major nor a minor in mathematics ... analyses have also shown that out-of field teaching greatly varies across schools, teachers, and classrooms. The crucial question, however ... is why so many teachers are teaching subjects for which they have little background.

What is certain is that educator qualifications are critical because it is their knowledge and expertise that is required in helping learners understand different subjects. About this matter it is argued that educators should possess adequate "...knowledge and skills to assist learners in solving problems, communicating clearly, making informed decisions, and in constructing new knowledge, products, or systems in diverse, engaged learning environments" (Jusuf, 2005, p. 34).

From the question on what participants felt could have been asked, the participants identified the availability of textbooks and laboratories as well as issues relating to parental participation; learner absenteeism; and the supervision of homework. With regards to the shortage of textbooks, rural participants complained about insufficient allocations. For example, participants indicated that allocations do not cover learners' needs. This may have negative effects in that learners in most cases share the textbooks. When books are shared this means some learners will not have the chance to use them at home which may affect the learning of a subject. About this issue, it is argued that "... if educators and learners do not have access to material such as textbooks to support their teaching and learning, it affects learners' performance" (Mulkeen, 2006, p. 21). Regarding the unavailability of laboratories it is pointed out that "... the poor results in science achievement reflect a general panorama of poor academic performance" (Fonseca & Conboy, 2006, p. 82). In this study's context participants complained about the non-existence of laboratories. This issue raised by participants is critical because the unavailability of laboratories deprives learners the opportunity to learn about and work with scientific equipment.

With regards to parental involvement, the rural participants felt that co-operation between parents and educators is crucial. However, they indicated that parents did not participate in school activities. Parental participation is important in the teaching and learning context because when parents are involved the burden of the educators is lessened. In fact, it is pointed out that parental involvement "... is a cost-effective and feasible way to improve the culture of teaching and learning ..." (Lemmer, 2007, p. 227). It is reported for example that parents who participate in their children's schooling impact positively on their academic achievement (Erlendsdóttir, 2010). With respect to learner absenteeism in rural schools, the participants felt that this was associated with parental non-participation. That the educators identified learners' absenteeism as important was critical. This is critical because it is argued that absenteeism "... is associated with several important indicators of student failure and poor adjustment to school (Sheldon & Epstein, 2004, p. 40). Mr Khuzwayo for instance, pointed out that illiteracy and non-participation resulted in parents not reporting to the school that a child will be absent. This situation is generally as a result of what researchers refer to as an inexcusable absence. For example, it is averred that inexcusable "... absences may be caused by *school withdrawal*, where parents deliberately

keep a child home from school for economic purposes ..." (Kearney, 2008, p. 452). With regards to homework supervision rural participants identified this as a contributory factor to learners' poor performance. Mr Ngubane for instance indicated that there was no supervision of school work at home and it was difficult to blame parents who were not educated.

7. Conclusions and Recommendations

The implications of the issues raised here from the rural perspective mean that there is an urgent need to address the participants' concerns. It is important then that government should provide proper and adequate school infrastructure. In this regard, when the classrooms, laboratories and libraries are built for instance, they should not be simple halls but must lead to favourable learning experiences. Such classrooms, laboratories and libraries it is suggested, should provide an environment where learning is relevant, creative, and provide vibrant experiences for the learners (Davidoff & Lazarus, 2002). This is important because it is argued that limited access to appropriate curriculum related materials affects students' success negatively (Taneri & Engin-Demir, 2011). With regards to sanitation, it was shown here that this is a fundamental human right. It is recommended therefore that "[H]igh priority needs to be given to the provision of safe and sustainable sanitation and water facilities and to promoting safe hygiene behaviours, particularly among children" (Lewin, Norman, Nannan, Thomas, & Bradshaw, 2007, p. 755). The importance of well resourced schools is that qualified educators may find the workplace pleasing and stay longer. This is a situation that may help improve learners' achievement in subjects like mathematics and science in rural schools. What this study seems to show is that participants identified resources and the availability of supporting infrastructure as crucial in ensuring that the learning and teaching context functions maximally.

8. Limitations

In this study we utilized interview to solicit information from a purposive sample. It is important therefore that these findings may not be generalized to all rural schools without considering the prevailing context. What is important here is noting that the interviews and the time they were carried out may have led the participants into reflecting their views in the manner they expressed them here. It could be that at another time and given another set of circumstances the participants' views may have been different. Nevertheless, the science educators interviewed here provided independent views about what they felt was the impact of poor infrastructure on the learning and teaching context, in their rural schools.

References

- Articles. (June 12, 2013) Academic performance – The effect of shortage of qualified teachers on the students in Ebonyi educational zone. Available at: <http://www.doublegist.com/academic-performance-effect-shortage-qualified-teachers-students/> Accessed on 2013/06/26.
- Balanskat, A. (2003). Policy briefings. Available at: http://insight.eun.org/www/en/pub/insight/policy/policy_briefings/archive/pedagogical_practices.htm Accessed on 2012/02/13.
- Banda, F. & Kirunda, F. (2005). Per Linguam. *Journal of Language Learning*, 21, 1–22.
- Collier, D.M. (2005). An ethic of caring: The fuel for high teacher efficacy. Available at: <http://sitemaker.umich.edu/kagan.356/teacher-eficacy>. Accessed on 2013/11/10
- Cresswell, J.W. (1998). *Qualitative inquiry and Research design: Choosing among five traditions*. London: Sage.
- Davidoff, S. & Lazarus, S. (2002). *The learning school. An organization development approach*. Lansdowne: Juta
- de Waal, M. (2013). A school journey into Eastern Cape's darkest heart. *Daily Maverick*, [April 2013]. Available at: <http://www.dailymaverick.co.za/> Accessed on 2013/05/10.
- Downey, D. (1994). The school performance of children from single-mother and single-father families: Economic or interpersonal deprivation? *Journal of Family Issues*, 15, 129–147.
- Dryden, G. & Vos, J. (2005). *The New Learning Revolution*. Stafford: Network Educational Press Ltd.
- Dube, B. & January, J. (2012) Factors leading to poor water sanitation hygiene among primary school going children in Chitungwiza. *Journal of Public Health in Africa*, 3 (1), 25–28
- Erlendsdóttir G. (2010). *Effects of parental involvement in education: A case study in Namibia*. Unpublished master's thesis, University of Iceland, Reykjavík.
- Fonseca, J.M.B. & Conboy, J.E. (2006). Secondary student perceptions of factors effecting failure in science in Portugal. *Eurasia Journal of Mathematics, Science and Technology Education*, 2 (2), 82–95.
- Govenda, P. (2010). The massive matric fiddle: Principals hold back weaker pupils to boost pass rate. *Sunday Times*, March 21, p. 10.
- Hanushek, E.A. & Woessmann, L. (2010). The economics of international differences in educational achievement. Institute for the Study

- of Labor [Forschungsinstitut zur Zukunft der Arbeit] IZA Discussion Paper No. 4925, Bonn, Germany. April 23, 2010.
- Ingersoll, R.M. (1999). The Problem of underqualified teachers in American secondary schools. *Educational Researcher*, 28 (2), 26–37.
- Ingersoll, R.M. (2005). The problem of underqualified teachers: A sociological perspective. *Sociology of Education*, 78 (2), 175–178.
- John, V. (2013). Forgotten schools of the Eastern Cape left to rot. *Mail & Guardian*, March 21. Available at: <http://mg.co.za/article/2013-03-08-00-forgotten-schools-of-the-eastern-cape-left-to-rot> Accessed on 2013/05/10.
- Jones, S.E., Brener, N.D. & McManus, T. (2003). Prevalence of school policies, programs, and facilities that promote a healthy physical school environment. *American Journal of Public Health*, 93 (9), 1570–1575.
- Jordan, J.L., Kostandini, G., & Mykerezi, E. (2012). Rural and urban high school dropout rates: Are they different? *Journal of Research in Rural Education*, 27, 1–21. Available at: <http://jrre.psu.edu/articles/27-12.pdf> Accessed on 2013/05/10.
- Jusuf, H. (2005). Improving teacher quality, a keyword for improving education facing global challenges. *The Turkish Online Journal of Educational Technology*, 4 (1), 33–37.
- Kallaway, P. (Ed.) (1984). *Apartheid and education: The education of Black South Africans*. Johannesburg: Ravan Press.
- Kearney, C.A. (2008). School absenteeism and school refusal behavior in youth: A contemporary review. *Clinical Psychology Review*, 28, 451–471.
- Knapp, E., Noschis, K. Pasalar, Ç. (Eds.). (2007). *School building design and learning performance - with a focus on schools in developing countries*. 12th Architecture & Behaviour Colloquium organised by Colloquia sàrl (Parc Scientifique à l'École Polytechnique Fédérale de Lausanne, PSE-C, 1015 Lausanne, Switzerland). Available at: <http://sdpl.coe.uga.edu/HTML/SchoolBuildingDesign&LP.pdf>. Accessed on 2012/11/28.
- Kruger, A.G. (1999). *Educational management. School management*. Pretoria: UNISA.
- Lemmer, E.M. (2007). Parent involvement in teacher education in South Africa. *International Journal about Parents in Education*, 1, 218–229.
- Lewin, S., Norman, R., Nannan, N., Thomas, E., & Bradshaw, D. (2007). Estimating the burden of disease attributable to unsafe water and lack of sanitation and hygiene in South Africa in 2000. *South African Medical Journal*, 97 (8), 755–762.
- Lolwana, P. (2004). What is the standard of the senior certificate examination? Umalusi report in context. *Paper presented at the Human Sciences Research Council's (HSRC) matric colloquium*, at the Sheraton Hotel, Pretoria, November 3, 2013.
- Mabogoane, T. & Pateli, F. (2006). Recognising behaviour that increases learning: the possible role of incentives in the teaching profession. *Perspectives in Education*, 24, 127–139.
- Milne, A., Myers, D., Rosenthal, A., & Ginsburg, A. (1986). Single parents, working mothers, and the educational achievement of school children. *Sociology of Education*, 59, 125–139.
- Mji, A. & Makgato, M. (2006). Factors associated with high school learners' poor performance: a spotlight on mathematics and physical science. *South African Journal of Education*, 26, 253–266
- Mulkeen, A. (2006). *Teachers for rural schools: A challenge for Africa*. Libreville, Gabon, March 27 – 31. ADEA biennale on Education in Africa: Association for the Development of Education in Africa.
- Murtaza, A. (2012). Pakistan: Lack of sanitation facilities in schools - An obstacle in girls' education. Available at: <http://www.humanrights.asia/ahrc-news/AHRC-ART-063-2012>. Accessed on 2013/06/27.
- Ndimande, B.S. (2009). "It Is a Catch 22 Situation": The Challenge of Race in Post-Apartheid South African Desegregated Schools. *International Critical Childhood Policy Studies*, 2, 123–139.
- Nkonkobe, Z. (2013). Schools to be fixed. *Daily Dispatch*, March 27, 2013. Available at: <http://www.dispatch.co.za/schools-to-be-fixed/> Accessed on 2013/04/10.
- Paton, G. [Education Ed.](July 12, 2012). Children being taught by 'under qualified teachers.' The Telegraph. Available at: <http://www.telegraph.co.uk/education/educationnews/9395084/Children-being-taught-by-under-qualified-teachers.html>. Accessed on 2013/09/12.
- Republic of South Africa Department of Education 2004. *Social development in South Africa*. Pretoria: Government Printer.
- Republic of South Africa Department of Education 2009.
- Scardamalia, M., & Bereiter, C. (1994). Computer support for knowledge-building communities. *The Journal of the Learning Sciences*, 3(3), 265-283.
- Sheldon, S.B. & Epstein, J.L. (2004). Getting students to school: Using family and community involvement to reduce chronic absenteeism. *The School Community Journal*, 14, 39 – 56.
- Singh, P. & Manser, P.G. (2002). Collegiality in education: A case study. *South African Journal of Education*, 22, 56–64.
- Sunday Times Editorial 2007. Deteriorating Grade 12 results. *Sunday Times*, December 30, 2007, p. 17.
- Surdy, E. (2011). Quality education for rural schools in South Africa: Challenges and solutions. *South African Rural Educator*, Vol. 1, December 2011.
- Taner, P.O. & Engin-Demir, C. (2011). Quality of education in rural schools: A needs assessment study. *International Online Journal of Educational Sciences*, 3 (1), 91–112.
- The Bulungula Incubator 2013. Equal Education visits dilapidated rural schools in our area. Available at: <http://bulungulaincubator.wordpress.com/2012/03/23/equal-education-visits-our-dilapidated-schools/> Accessed on 2013/05/10.
- Uline, C. & Tschannen-Moran, M. (2008). The walls speak: Facilities and school climate. *Journal of Educational Administration*, 46, 55–73.
- Wade, B. & Moore, M. (2000). A sure start with books. *Early Years*, 20, 39–46.
- Wild, S. (2012). Technology in rural schools is not a magic bullet, but it is a good start. *Business Day*, December 05. Available at: <http://www.bdlive.co.za/blogs/science/2012/12/05/technology-in-rural-schools-is-not-a-magic-bullet-but-it-is-a-good-start> Accessed on 2013/05/10.