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LEARNERS' PERCEPTION ON THE EFFECT OF INFRASTRUCTURE DEVELOPMENT ON ACADEMIC PERFORMANCE IN PORT ELIZABETH PUBLIC SECONDARY SCHOOLS

BY

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DECLARATION

I, Nomava Goduka, hereby declare that the treatise for Masters in Property Economics and Valuation to be awarded is my own work and that it has not previously been submitted for assessment or completion of any postgraduate qualification to another University or for another qualification.

...*N.Goduka*..........

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ABSTRACT

South Africa is striving to attain quality equal education; however, this ideal is affected by various factors such as discrimination, learner-related challenges (e.g. dilapidated rural schools, poverty, and violence), educator-related challenges (e.g. low morale and motivation, and poor administration and management of schools), and governmental issues (e.g. a lack of will, lacklustre attitudes, and an inability to deliver resources and/or services). While the National Department of Basic Education is battling to eradicate the backlog of school infrastructure and maintenance, mud schools are still prevalent in rural areas. The present state of poverty-stricken areas is most affected by the mentioned challenges and, as a result, it is necessary to determine the nature and extent of the consequences in terms of academic performance.

This study, therefore, investigated the reality of the current rural school situation by investigating the perceptions of learners on the effect of infrastructure development on their academic performance in public secondary schools. Three secondary schools in the Motherwell area in Port Elizabeth were chosen for the research setting. A quantitative research approach was deemed suitable for the study, and a questionnaire was utilised for data collection. A total of 151 questionnaires were completed.

The key findings derived from the data indicated that inadequate infrastructure has a negative impact on academic performance. Some of the key issues pertaining to infrastructure included inadequate leisure areas, laboratories, libraries, and sport fields. Overcrowding in classrooms were also found to be prevalent, and posed a major barrier to learning.

The findings of the study provided insights into the reality of rural education and were used as a basis for offering recommendations that may assist stakeholders to improve the current situation.

Keywords: School infrastructure, academic performance, facilities.

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LIST OF ACRONYMS AND ABBREVIATIONS

ASIDI   Accelerate Schools Infrastructure Delivery Initiative

DoE   Department of Education

GIAMA   Government Immovable Asset Management Act

NEIMS   National Education Infrastructure Management Systems

OECD   Organisation for Economic Cooperation and Development

PFMA   Public Finance Management Act

PID   Provisional Infrastructure Directorate

PMG   Parliamentary Monitoring Group

SASA   South African Schools Act

SGB   School governing body

SONA   State of the Nation Address

UNSECO   United Nations Educational, Scientific and Cultural Organization.

WHO   World Health Organization

CHAPTER 1

THE PROBLEM AND ITS SETTING

1.1   INTRODUCTION

Education is vital for development. Mandela, Hatang and Venter (2012:101) state, "Education is the most powerful weapon which you can use to change the world". Therefore, in recent years, school transformation, particularly with regard to school infrastructure, has been highlighted as a key factor for improving basic education in South Africa (Chürr, 2015:2407). School infrastructure is an important foundation for teaching and learning to be effective (Mokaya, 2013:15).

The United Nations Educational, Scientific and Cultural Organization (UNESCO) is committed to addressing sustainable development challenges through education (Leicht, Heiss, & Byun, 2018:25). A study by UNESCO in Latin America indicated that higher dropout rates in rural areas are often due to inadequate school infrastructure (Adean Development Corporation-Development Bank of Latin America[CAF], 2016). Marishane (2014:325) and Mokaya (2013:11) similarly state that most schools in Africa do not meet the basic standards of health and safety due to poor planning. These basic standards include offering schools that are obstacle-free and sensitive to the needs of children (Mokaya,2013:22). The development and construction of high-academic performing schools within a healthy school environment should be part of urban growth management (Environmental Protection Agency, 2018).

South African public secondary schools, therefore, need adequate infrastructure for the delivery of quality education (Marishane,2014:326). Yet, South Africans have shown concern for the status of infrastructure in public secondary schools (Marishane, 2014:330). The quality of basic education has not improved due to a lack of national norms and standards (Amsterdam, 2010:2).

Despite these issues and standards, there is little understanding of the relationship between the learner environment and academic performance (McGowen, 2007:30). Amsterdam (2010:4) notes, "school infrastructure in developed settings find students density, aesthetic, technology, heating, and lighting are important than in developing settings". The Education for Sustainable Development further promotes holistic and

transformational education for the future (including considerations for school infrastructure), which equips learners with personal development for the 21st century (Leicht *et al.*, 2018:25).

1.2   THE STATEMENT OF THE PROBLEM

There are significant areas of concern pertaining to the influence of school infrastructure on the academic performance of learners. For example, in a research study performed by Okafor, Maina, Stephen, and Ohambele (2016:1181), the researchers found that the academic performance of learners can be enhanced by providing an adequate environment. Specifically, the authors highlighted the need for infrastructure and facilities (e.g. classrooms) that are conducive to learning, as well as adequate sanitation facilities (Okafor *et al.*, 2016:1180).

The Department of Education (DoE), which is responsible for the provision of adequate learning environments and infrastructure, seems to be failing in its task, particularly when considering the poor state of some school buildings and facilities, especially within the Eastern Cape (Equal Education, 2019). In 2017, a school monitoring survey was performed by the DoE, which determined that only 59% of schools in the country fulfilled the minimum physical infrastructure criteria; even the most basic facilities were not provided universally. Inadequate infrastructure leads to many related challenges, including overcrowded classrooms, high absenteeism rates of both learners and educators, unsafe environments, adverse behaviours, negative attitudes in learners, and poor academic performance (Amsterdam, 2010:4, Muthoni, 2015:11and Parnwell, 2015:15).

The DoE needs to become more aware of the influence of inadequate school infrastructure on learners' academic performance. This study, therefore, investigated the extent to which school infrastructure impacts learners' performance in public secondary schools.

1.3   THE STATEMENT OF THE SUB-PROBLEMS

Sub-problem 1:

- It is evident that facilities at public secondary schools are inadequate.

Sub-problem 2:

- Health and safety measures are insufficient at secondary schools.

Sub-problem 3:

- The maintenance of facilities at secondary schools are lacking.

1.4   THE HYPOTHESES

Hypothesis 1:

The academic performance of learners is negatively affected by inadequate facilities.

Hypothesis 2:

The academic performance of learners is negatively affected by insufficient health and safety measures.

Hypothesis 3:

The academic performance of learners is negatively affected by a lack of maintenance of facilities.

1.5   THE OBJECTIVES

The purpose of this study was to examine the impact of inadequate school infrastructure on learners' academic performance in public secondary schools in Port Elizabeth. This aim was achieved by meeting the following objectives:

- To determine the perception of learners on the effect of infrastructure on their academic performance.
- To determine the perception of learners on the influence of health and safety measures on their academic performance.

- To determine the perception of learners on the maintenance of infrastructure on their academic performance.

1.6   LIMITATIONS OF THE STUDY

Only learners in public secondary schools in a selected township based in Port Elizabeth were involved in this study.

1.7   THE DEFINITION OF THE KEY TERMS

Academic performance: The outcome of education; the extent to which a learner has achieved the outcomes of subjects; the measure to which a teacher or institution has achieved educational goals (Katsikas & Panagiotidis, 2010:10).

Co-curricular facilities: Infrastructure that is meant to bring about social and physical adjustment in a child (e.g. sports fields and recreation centres) (Edglossary, 2013).

Infrastructure: The basic systems and services needed for an organisation to work smoothly (Oxford, 2018). This current study focusses primarily on physical facilities in schools.

School infrastructure: The physical teaching and learning space (classroom, laboratories, computer labs); spaces that support teaching and learning, libraries, health centres, sports facilities, multi-purpose school halls; facilities for school nutrition and feeding programs and teaching housing (Department of Education, 2009:5).

1.8   THE ASSUMPTIONS

- It is assumed that adequate infrastructure development would enhance the academic performance of learners.
- It is assumed that learners are aware that inadequate infrastructure development has a negative effect on their academic performance.
- It is assumed that teachers and principals of secondary school are aware that inadequate infrastructure development has a negative effect on learners' academic performance.

1.9   THE IMPORTANCE OF THE STUDY

The study could be useful to both the DoE and the Department of Finance with regard to the implementation of policies and strategies for school infrastructure development in public secondary schools. District officials could also be provided with recent data regarding structural inadequacies, which they could incorporate into their considerations for allocating budgetary priorities. Similarly, policy stakeholders would gain recent data to incorporate into their updating of building standards. Addressing the challenges related to school infrastructure may require more funds, but could greatly improve the efficiency of infrastructure, governance, and accountability and could also create innovation and cost savings in schools in the long-run.

It should be noted that this study went beyond the standard design and construction practices and highlighted high-performance building elements that could help schools focus on reaching community-based environmental, economic, and social goals. High-performance school building design can result in lower operating and maintenance costs as well as reduced energy bills. If planned and implemented carefully, such design can also contribute to healthy and productive school environments . A lack of this study's type of investigation has led, and could have continued to lead, to inadequate classrooms being built, weak monitoring of policies, and low construction quality (Gershberg, 2014:12). There was a clear need, therefore, for research related to the quality of school infrastructure and the influence it has on academic performance. This study also aligns with McGowen's (2007:41) statement, "With the implementation of No Child Left Behind Act, schools must continue to improve student performance".

1.10   THE OUTLINE OF THE STUDY

CHAPTER 1: THE PROBLEM AND ITS SETTING

Chapter 1 provided a brief contextual overview of the research topic by illustrating the influence of school infrastructure on student academic performance. Immediately after the introduction, the chapter defined the statement of the problem, sub-problems, hypotheses, objectives, and delimitations. The chapter also included a definition of key terms, stipulated assumptions, and highlighted the importance of the study.

CHAPTER 2: REVIEW OF THE RELATED LITERATURE

Chapter Two describes the effect of inadequate infrastructure on all stakeholders, which include learners, educators, society, and the country as a whole. Another significant point that is included in the chapter is the specific focus on the academic performance of learners in schools with poor infrastructure. The review addresses how recreational facilities influence academic performance, the importance of the maintenance of school facilities in public secondary schools, and the health and safety measures that should be in place at public secondary schools. The review ends with a description of the ideal environment in respect to school infrastructure that is most conducive to acceptable levels of academic performance.

CHAPTER 3: RESEARCH METHODOLOGY

Chapter 3 provides a detailed outline of the research methodology, along with the tools and techniques that were utilised for data collection. The chapter concludes with an outline of how the data were obtained, processed, and analysed.

CHAPTER 4: RESULTS, ANALYSIS AND INTERPRETATION

The fourth chapter offers a presentation of the response to the study's questionnaire, which includes:

- The demographic profiles of the respondents in terms of age, gender, and experience.
- The testing of Hypothesis 1 and a discussion of the related results.
- The testing of Hypothesis 2 and a discussion of the related results.
- The testing of Hypothesis 3 and a discussion of the related results.

CHAPTER 5: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

This final chapter provides a summary and conclusions drawn from the results of the survey and literature review. The need for further topics to be researched and the limitations of the study are also explained.

1.11   CONCLUSION

School infrastructure and facilities are a major component of education, yet the DoE is struggling to abide by the norms and standards set out by Government in that they cannot provide adequate infrastructure. As a result, academic performance is compromised. This situation is especially evident in schools in the Eastern Cape. The rural areas in this province are particularly affected, and this study, therefore, investigated this phenomenon within the noted setting.

This chapter outlined the background information pertaining to the criteria set out for this study, which includes: the objectives, assumptions, and significance of the study. The next chapter presents the literature review.

CHAPTER 2

THE REVIEW OF THE RELATED DATA

2.1   INTRODUCTION

In establishing the success of a national system of education, secondary education is universally acknowledged as a fundamental stage (Chürr, 2015:2415). Most of the people, who compose of the skilled manpower of a nation, are trained before the end of their high school years (Singh & Stückelberger, 2017:35). The quality of higher education also depends upon the quality achieved at this lower level of education (Marishane, 2014:325). The formation of an individual's character as well as the foundation of future leaders are laid at this level, which comes at a time when youth are in their formative adolescent stage (Singh & Stückelberger, 2017:65). This means that secondary education is the foundation for further studies as well as for the development of a nation (Chürr, 2015:2425).

Inadequate school infrastructure has far-reaching implications. Such implications not only relate to learners obtaining low grades or failing but have a ripple effect that ultimately influences the very fabric of society (Chürr, 2015:2435). Education forms the basis of tomorrow's thinkers, philosophers, academics, leaders, and decision-makers (Mokaya,2013:22). It is also a primary means for enhancing the quality of life for an individual as well as society (Marishane, 2014:327). The country, therefore, needs quality learners that can improve the lives of all its citizens, in terms of economic growth, poverty reduction, skilled professionals, and so forth (Spaull, 2013:437). However, poor school infrastructure means that the country fails to gain such improvements (Spaull, 2013:437).

The following sections describe the effect of inadequate infrastructure on all relevant stakeholders, including learners, educators, society, and the country. Another significant point discussed is that of the academic performance of learners in schools with poor infrastructure. Specifically, the review focusses on classroom and recreational facilities; health and safety measures; and the design and maintenance school infrastructure that influence academic performance. The review also describes the ideal school infrastructure that promotes acceptable levels of academic performance.

2.2   THE EFFECT OF INADEQUATE INFRASTRUCTURE

Infrastructure is a vital part of the learning and teaching process (World Bank, 2017). Infrastructure can be viewed as enabling tools that give individuals access to teaching aids, including technology, which could be beneficial for teaching, learning, and administrative functions (Stosic, 2015:111). When there is a lack of basic infrastructure, such as electricity, other infrastructure, such as information technology, is rendered impractical (O'chien'g, 2013). Thus, poor basic, and related comprehensive infrastructure, impacts progress in education in terms of effectively equipping learners with the necessary skills required in the real world (Chürr, 2015:2450). The lack of infrastructure and facilities in under-resourced schools are directly connected to high rates of academic failure (Parnwell, 2015:7).

The consequences of inadequate infrastructure are far reaching; for example, when classroom infrastructure is upgraded to acceptable levels while sanitation facilities are not up to standard, learning and teaching barriers will continue to persist (World Bank, 2017). Highly-rated educators also tend to prefer not to work in deficient conditions, and those that are left behind are may begin to seek employment where they do not have the challenges of teaching accompanied by infrastructure barriers, which places an extra demand on them (Nel, Tlale, Engelbrecht & Nel, 2016:2). It is, then, the quality of education that suffers due to the inability of under-resourced schools to attract and retain suitably-qualified teachers. The result is that failure rates tend to be higher in poor infrastructure schools, and those learners that do manage to pass often report an inferior education when measured against learners from high-quality education systems (Equal Education, 2016).

Educators are of the opinion that decision-makers should change their attitudes pertaining to delivering school infrastructure that is conducive to academic achievement (Salary, Holliday, Keesee & Wachter, 2018:180). Inadequate infrastructure leads to an environment which affects both learners and educators in a negative way (Stosic, 2105:112). Educators are responsible for creating an environment which promotes learning, but inadequate facilities are an interference to learning (Rammala, 2009:22-26). Learners are meant to be comfortable in their school settings (Rammala, 2009:18).

Additionally, unmaintained and rundown buildings further contribute to negative academic outcomes, since the learning and education processes are complicated by such an environment (Gershberg,2014:18). Superficial improvements are not the answer when learners' spirits are already broken down by uncomfortable conditions due to a lack of proper buildings and facilities (Salary *et al.*, 2018:170). Therefore, in order to enhance learner performance, decision-makers, including the government, should evaluate the conditions of facilities and then improve poor conditions to such an extent that learners can experience a positive learning environment (McGowen, 2007:33).

Various schools' systems, predominantly those in high poverty-stricken areas, are overwhelmed by poorly planned infrastructure and old, unmaintained buildings that pose a risk to the health, safety, and learning environment of learners (Mokaya, 2013:25). Poor school infrastructure affects learners negatively in the sense that the best available educators do not tend to apply for positions at schools with poor infrastructure, which means that the learners at these schools are disadvantaged (Singh, 2015:5).

Inadequate school buildings and facilities further affect educators' employment and choice of job application, as educators often choose not to be stationed at schools with infrastructural problems because poor infrastructure makes their work more difficult (Nel, Tlale, Engelbrecht & Nel, 2016:9). Adverse conditions include inadequate protection from the elements, the sharing of toilets with learners, dirty floors, and broken windows (Mashaba & Maile, 2013:175). An educator who must endure these types of poor conditions can experience breaks in their morale, commitment, and effort (Gershberg, 2014:16). Similarly, learners in schools with poor facilities often report negative attitudes towards schooling, poor health statuses, unaccepted behaviour, low morale, lower levels of learning, and poor academic performance (Pennsylvania State University, 2015).

Good academic achievement and high standards of education cannot occur in schools with high levels of inadequate facilities (e.g. where buildings are unmaintained and/or in a state of disrepair) (Mokaya, 2013:35). Usually, in cases of poor infrastructure, a shortage of space occurs due to the existence of unusable buildings (Stosic, 2015:113).

One of the most problematic areas of the school system is that of classroom dynamics (Parnwell,2015:8). Classroom dynamics are a vital part of the learning environment; when shortages of space occur, it leads to overcrowding (Rammala, 2009:22). Learners, then, are forced to spend a significant amount of time in overcrowded classrooms, which forms an interruption to the quality of their education (Muthoni, 2015:11). As per the DoE (2009), learning facilities need three types of spaces:

- **Main education spaces**, which include spaces such as classrooms, workshops, labs. Secondary spaces related to the main education spaces are needed for storage (e.g. for storing stationary, teaching and learning materials, and equipment), while related critical spaces that are useful for learners are also necessary (e.g. ablutions, libraries, and playing fields).
- **Administrative areas**, which are used by a school's administrative office and teachers. These spaces include the school principals' offices, storage rooms, and staff rooms.
- **Secondary support educational spaces**, which are for learners' use but are not necessary for a school to operate smoothly (e.g. sports grounds, assembly halls, and school kitchens) (DoE, 2009).

The DoE (2009) policy guidelines related to infrastructure facilities that form part of the basic minimum standard to promote and expedite the primary objectives of adequate schools are listed and described in Table 2.1.

Table 2.1: Basic educational facilities

Structure	The physical teaching and learning space (e.g. classroom, laboratories, computer labs). The building is to be structurally stable and weatherproof according to local environmental conditions.
Administrative offices	Separate space for faculty/administrative personnel gives privacy to learners and teachers and maximises the use of classroom space, thereby enabling staff to work separately from learners. Proximity between classrooms and administrative offices is recommended to monitor learner activities and create safety and transparency.
Library	A designated space where books and learning resources are available in a proper reading environment is central to learning and teaching activities. The library or resource room needs to be strategically located within the school for easy access, but away from noisy areas.
Sports fields and landscaping	The basic minimum space for soccer/rugby as well as spaces for netball or volleyball. The basic level of provision must be levelled compacted earth field. School grounds form an integrated, holistic unit with the school buildings and their users. Trees are vital for filtering sun, dust, and noise, as well as for beautifying the school.
Sanitation, water, and electricity	Separate toilets should be available for girls and boys. Teachers need to have separate facilities for men and women. A separate space should be provided with water and soap for washing hands. Fresh potable water should be available to learners. The school should have a power source to provide light, connectivity for communication equipment, and other appliances.
Kitchen	Space for school meal preparation with equipment and furniture that ensure food is kept fresh.
Security, health, and safety provisions	Boundary fences provide protection to learners from outside elements. Fire prevention and emergency evacuation plans must be part of the school design. Construction materials should be free of components that can be hazardous. Schools should have medical aid-kits or medicine cabinets for emergencies.

Source: United Nations Children's Fund (2009) in (Department of Education,2009)

It is important to note that many schools in South Africa fail to meet the basic standards presented in Table 2.1 (Marishane, 2014:328). Consequently, the poor state of infrastructure has a negative effect on learner performance, which means that the classroom atmosphere, amongst other aspects, is an important factor of consideration (Mokaya, 2013:40).

2.2.1 Influence of classrooms on academic performance

Classroom administration is a vital part of efficient and effective teaching (Parnwell, 2015:8). Successful classroom management, which starts with well-organised and efficiently planned and prepared lessons, assists educators to teach learners how to learn (Dangara, 2016:28). Research indicates that learners perform well in a cheerful classroom atmosphere and an environment in which they are safe, cared for, and can practice interactivity (Cheryan, Ziegler, Plaut, & Meltzoff, 2014:6). Successful classroom management provides learners with opportunities to socialise while learning interesting content (McGowen, 2007:21). Effective classroom management comprises the prevention of poor discipline and the conveyance of interesting information (Sieberer-Nagler, 2016:164). In order to ensure a mutually beneficial classroom environment, a classroom should be well equipped and facilitated (Evan *et al.*, 2010:239). The physical arrangement of a classroom offers learners positive instruction and encourages a smooth teaching and learning process (Rammala, 2009:19). Additional physical facilities should also be in place, as they are supportive in enhancing the overall performance of the school (Sieberer-Nagler, 2016:169).

Learners' perspectives are often driven, whether consciously or unconsciously, by how they perceive their school environment, especially their physical environment, and negative attitudes result in poor academic performances (McGowen, 2007:28). Hence, building quality is an important predictor of teacher rejection of positions as well as of student learning (Sieberer-Nagler, 2016:169)

Physical and emotional health are also factors that play a significant role in the performance of both learners and educators (Dangara, 2016:29). These factors are related to the quality of facilities and the condition of school buildings, which, in turn, dictate the overall school environment. An inadequate environment can contribute to poor physical and mental health for example learners need clean water to drink, clean water for hygiene and adequate sanitation facilities because a contaminated

environment can cause or exacerbate health problems (Pennsylvania State University, 2015).These include short-term health effects such as infectious disease, respiratory infections that can reduce school attendance and learning ability (Pennsylvania State University, 2015). A poor environment, in turn, relates to poor attitudes towards schooling and education (Salary *et al.*,2018:171). In all, the atmosphere of schools was found to be directly related to the quality of school buildings, which play a major role in learner performance (Amsterdam, 2010:2).

Inadequate school buildings have been found to lead to absenteeism, which is an indicator of poor attitude towards education (Gershberg, 2014:21). When the spirit of academic performance is broken, it leads to poor academic results (Mokaya, 2013:14). Learners in poor quality school buildings have been found to be absent more often (Evan, Jun, & Sipple, 2010:239). The school environment, thus, has the power to be either a motivating factor or a demotivator for educators and learners (Muthoni, 2015:13). Poor facilities have also been linked to adverse and disorderly behaviour, as learners display negative attitudes in these kinds of environments (McGowen, 2007:18). Such negative behaviour, in turn, poses further challenges to educators (McGowen, 2007:18).

Various studies have found that learners in adequate school buildings tend to perform considerably better in test scores than their counterparts in inadequate school buildings (Siebere-Nagler,2016:165 and Department of Basic Education, 2017). In South Africa, with its many challenges, it is vital for the education system to deliver well-educated learners who can contribute to the economy (Mokaya, 2013:16). Well-educated learners can also contribute to a countries' competitiveness in the global arena (Cheryan, Ziegler, Plaut, & Meltzoff, 2014:6).

The effectiveness of educational development relies on factors that drive attendance and keeping children at school (Awuah, 2007). However, studies done from a psychology perspective pertaining to education have indicated that environmental factors also have an impact on classroom dynamics (Okafor *et al.*, 2016:1177 and Leicht *et al.*, 2018:25). In order to improve learner achievement and motivation, attention needs to be given to the physical and symbolic elements in the classroom (Rammala, 2009:19) . These symbolic features include wall decorations, images, and items that are exhibited in classrooms that hold the potential to create a positive

classroom atmosphere (Cheryan *et al.*, 2014:9). Symbolic features convey a subliminal message to learners, namely that they are valued (Cheryan *et al.*, 2014:9). This message serves as an encouragement, which can result in quality education (Cheryan *et al.*, 2014:11). Classrooms form part of the infrastructure of school settings and learners spend a great deal of time in them; thus, classrooms must be learner friendly (Muthoni, 2015:14).

2.2.2 The Effect of Class Dynamics from an Educator's Perspective

Teachers become discouraged when they have to deal with a working environment that negatively affects them (e.g. having insufficient lab space and small classrooms) (McGowen, 2007:15). Educators have indicated that overcrowded classrooms are responsible for wasting teaching time, as attention is directed at maintaining discipline, keeping classes orderly, and maintaining noise levels as opposed to teaching (Amsterdam, 2010:4). Studies regarding class size have also shown that the size of a class influences learner and teacher behaviour, with smaller classes generally producing less stress and fewer behavioural issues than larger classes (Marishane,2014:1326 and Mokaya, 2013:17). Performance levels of learners are also improved in smaller class settings, since more attention can be given to individual learners than what is possible in larger classes (Parnwell, 2015:8). Overcrowded classes, conversely, produce learners with high illiteracy levels due to learners having difficulty writing and educators struggling to move around to attend effectively to all students (Muthoni, 2015:13).

Well maintained, user-friendly infrastructure facilities and equipment is directly related to high standards of education (Singh, 2015:5). The physical structures of schools that are in a poor state compromise classroom space, which often forces officials to use available space to accommodate more learners (Parnwell, 2015:8). A solution would be the creation of adaptable classroom spaces see Figure 2.1 illustrating classroom design (Cheryan *et al.*, 2014:11) . Such spaces could be easily managed to accommodate varying class sizes; thereby offering learners the ability to physically interact in learning exercises (Muthoni, 2015:14).
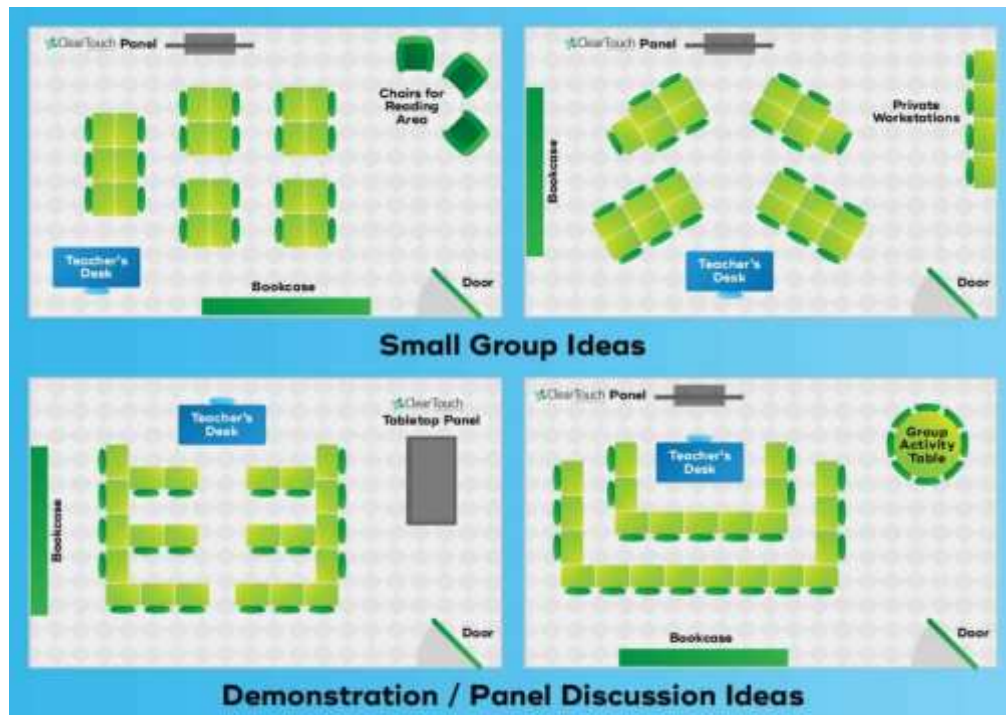
Figure 2.1 : Classroom Design

Source: (Cheryan *et al*., 2014:11)

2.2.3 Recreational Facilities Influence on Academic Performance

The trend, globally, pertaining to education is to emphasise a humanistic view (UNESCO, 2015). In other words, schooling is used as a means of promoting health in all its forms, together with a healthy lifestyle (UNESCO, 2015). In the present state of the South Africa education system, the curriculum is designed for learning, but provision has not been made for societal dynamics, emotional intelligence, and cognitive development; additionally, artistic development, sporting activities, and other enrichment programmes are supplementary, but not always available (Todhunter-Reid,2019:113)

According to Dyment and Bell (2008), school grounds covered with recreational grass lawns, flowers, vegetable gardens, trees, and other greenery reveal a positive effort to offer educators, learners, and the general community an environment which promotes the better physical interaction for learners. Such green spaces afford learners enhanced academic, social, and emotional educational prospects and are conducive to relieving stress (Talebzadeh & Jafari, 2012:1612).

Aesthetic green environments also encourage several leisure and inclusionary prospects for all learners, including those with disabilities, and teachers (Dyment & Bell, 2008). The most important role played by well-maintained green environments is their advantages in terms of learner behaviour, as learners are free to enjoy a relaxed atmosphere both inside and outside the classroom (Todhunter-Reid, 2019:113). This relaxed atmosphere, in turn, promotes better school attendance (Usaini, Abubakar & Bichi, 2015:204). This phenomenon is especially applicable to low-income communities, as it is often seen that adolescent learners from poor neighbourhoods, which report higher levels of 'toxic' physical and psychological environments, benefit extensively from green spaces that offer a safe and relaxing haven (Dyment & Bell, 2008).

An active lifestyle that includes sporting activities can contribute to the enhancement of learning social skills, the promotion of interactions with people of diverse cultures, the building of relationships with new friends, and the development of new dimensions of communication (Matsuoka, 2010:275). These activities also contribute to health, since humans are designed to be active (Fathi, 2009). Additionally, active co-curricular activities can bring families together, strengthen family relations, and bring about social activities (Kweon, Ellis, Lee & Jacobs, 2017:35).

Physical activities can also be entertaining, are a great way to spend leisure time, and can help to improve happiness and a sense of achievement in individuals (Elmaghraby & Kenawy, 2016:3). Co-curricular activities can, thus, contribute to social and mental health (Fathi, 2009). Sports activities also do not simply advantage mental and physical health or leisure but can even be directed in such a way as to benefit academic achievement (Todhunter-Reid, 2019:116). In such cases, sports and similar active co-curricular activities can be directed to support academic goals, by enhancing, for example, a learner's self-awareness, confidence, and/or positive behavioural change (Kimengi, Kiptala, & Okero, 2014:463).

Muthoni (2015:16) and Mokaya (2013:45) state that adequate co-curricular facilities are necessary for talent development. Hence, schools with poor co-curricular facilities disadvantage their learners on an emotional, physical, and intellectual level.

2.3   HEALTH AND SAFETY MEASURES

The World Health Organization (WHO) describes school facilities as an procedure of services for the improvement of learners' physical, psychological, and social well-being with the intention to develop their learning competencies (Health Basic Education, 2012). Studies have revealed that a school which is designed to promote cleanliness and safe learning conditions contributes to higher levels of academic achievement (Mokaya, 2013:30 and Jimerson, Hart & Renshaw, 2012:11). Safe school environments also create feelings of security in learners (i.e. learners should feel safer in school than in their possibly unsafe environments outside of school) (Cornell & Mayer, 2010:8). When learners are positive about school, it translates to improved academic performance, and safe school environments encourage social and creative learning that can promote such positivity (Le, Janssen & Wubbels, 2018:106). Conversely, unsafe schools, where learners feel at risk, lead to increased stress and many discomforts that can lead to absenteeism or dropouts (Gershberg, 2014:11). Safe school environments create a free, open space for learners to learn and grow (Kutsyuruba, Klinger, & Hussain, 2015:119).

A major part of ensuring safe schools is providing access control (Cornell, 2018:127). That is, in order to keep schools safe, people should not have easy access by means of entrance through broken boundary walls, damaged entry gates or fences, or so on (Cornell, 2018:122). Preventative maintenance should, therefore, be normal practice at schools before infrastructure deteriorates to a state of disrepair (Kimengi *et al.*, 2014:470). Another important facet of safety is the conduction of fire drills and safety training (Cote-Lussier & Fitzpatrich, 2016:547). Learners and educators must be informed about safety procedures in times of emergencies (e.g. the proper manner to exit buildings – i.e. quickly, yet calmly – and the assembly point). Educators should also be taught how to react without panicking and to assist with emergency procedures (e.g. find the nearest and best exits) (Applebury, n.d.). In addition, schools should have emergency supplies for instances of accidents and/or injuries (Bear, Yang, Pell & Gaskins, 2014:340)

2.3.1   Sanitation Facilities Influence on Academic Performance

Providing safe and enough water, sanitation ,and shelter from the elements are all necessities for a healthy physical learning environment (Equal Education, 2019).

Equally significant is the defence from biological, physical, and chemical risks that may threaten children's health (Eshum, Acquah & Acquaye, 2014:148). Infectious diseases carried by water, as well as physical dangers associated with poor construction and maintenance practices, are examples of risks that children and school personnel face at schools throughout the world (Ochien'g, 2013:12). When learners and educators experience a sanitary environment of a high standard, their states of mind are more amenable to learning (Nwakile, Eze & Okanya, 2017:1121). Thus, it is vital to constantly maintain high standards of hygiene and environmental quality in order to sustain the health of learners and educators and ensure improved academic achievement (Awuah, 2007).

Unmaintained water and sanitation facilities can turn schools into unhealthy environments which can lead to epidemics as diseases become more easily transmitted easily (Ochien'g, 2013:14). Such poor health conditions, in turn, can negatively impact on learners' ability to attend classes, and the people with who they live (e.g. their families) as well as the greater community also increase their risk of being infected (Ochien'g, 2013:16). As a result, learners' academic performance can become compromised (Ochien'g, 2013:18).

Poor hygienic conditions, a lack of water, and inadequate sanitation facilities can also lead to dropouts, especially amongst female learners (Agol & Harvey, 2018a:286). Female educators and girls tend to feel the impact of adverse conditions the most because a lack of water and inadequate sanitary facilities often results in their having to stay away from school during their menstrual period (Agol & Harvey, 2018a:290). Continued absenteeism as a result of poor and unclean facilities that do not accommodate female's hygiene needs often leads to girls dropping out of school (Jasper, Bartram, & Le, 2012). Poor sanitary conditions also violate the rights of girls to dignity, negatively impacts their self-esteem, robs them of equality, adversely affects their health, removes their right to privacy, and, ultimately, compromises their right to basic education (Section 27, 2013).

Furthermore, substandard school infrastructure and, specifically, a lack of water and inadequate sanitation have all been connected to a decline in learners' capability to concentrate and their motivation to learn (Agol, Harvey & Maillo, 2018b:55). Consequently, learners often experience an escalation of absenteeism from school,

which results in a negative impact on both their education and their health (Deroo, Walter & Graham, 2015:516). The provision of safe, clean water and sanitation facilities in school has, however, been found to often be insufficient in Africa (Deroo, Walter & Graham, 2015:518). The upkeep of such facilities is very important, and behavioural transformation is also necessary to ensure that the facilities are properly utilised and maintained (Ochien'g, 2013:18). Clean, functional sanitation facilities, safe and inviting spaces to play, and areas for socialisation should all be high on the agenda of secondary schools in South Africa (Amsterdam, 2010:2).

Although policies and strategic plans are in place, the actual implementation thereof is lacking, as shown by the many incidents at schools that have resulted in fatalities due to the maintenance of infrastructure not being taken seriously (Burton & Leoschut, 2013; Parliamentary Monitoring Group [PMG], 2015). In 2018, the PMG called for a hearing to evaluate school performance in terms of pit latrines, emphasising that this investigation was motivated in order to respond to the president's directive for an audit of school sanitation facilities following the death by drowning in a pit latrine of Lumka Mketwa in 2018 at an Eastern Cape primary school. At this hearing, it was revealed by the Minister of Education that the audit was a work in progress (PMG, 2018).

From a global perspective, the absence of proper sanitation has been found to be one of the main contributing factors to high dropout rates, especially amongst teenage girls (Burgers, 2000; Fentiman, Hall, & Bundy, 1999; Kirk & Sommer, 2006; UNCF, 2010; WHO, 2005;). In a study by Khumalo and Mji (2014:1521), the authors found that pit latrines are not only a health risk, but have far reaching consequences, because poor sanitation and no water supply are often related. Sanitation facilities also sometimes consist of only two pit latrines for a population of over 500 learners, which means that learners must use alternative facilities located further from the school (Marishane, 2014:326). For example, learners may need to use ablutions located in nearby households; such practice is a safety concern, since learners are left without supervision (Burton & Leoschut, 2013; Khumalo & Mji, 2014:1521).

Another one of the critical challenges faced by schools with poor sanitation facilities is high educator vacancies, as teachers do not wish to work in schools with poor sanitation (Khumalo & Mji, 2014:1521). This situation was further highlighted by the PMG (2018) hearing, yet the DoE did not appear to be aware of the importance of

infrastructure maintenance, which has resulted in discouraging educators and lowering pass rates (Mathews, 2018).

2.3.2   Infrastructure Hazards

In case, where infrastructure is in place but not properly maintained, the consequence can be unsafe school infrastructure (Dlamini, 2019; Mathews, 2018). For example, a bridge collapsed at Hoërskool Driehoek in 2019; 26 learners aged between 13 and 18 were on the bridge when the incident occurred and four learners were fatally injured (Dlamini, 2019; Mathews, 2018). This incident resulted in Equal Education applying to the court to force the DoE to act in terms of repairing unsafe infrastructure (Equal Education, 2016). The Eastern Cape High Court ruled that delaying maintenance was unconstitutional and invalid; however, progress of repair is slow (Dlamini, 2019). The factors that lead to adverse conditions in schools, additionally, lead to absenteeism (Kearney, 2008:455).

2.3.3   Absenteeism

Various studies define absenteeism as student behaviour grounded on physical, psychological, and social reasons that negatively affect their development (Ocak, Baysal, & Ocak, 2017:332, Khalid & Khalid, 2017:153 and Cespedes, Vara-Hoina, Lopez-Odar, Santi-Huaranca, Diaz-Rosillo & Asencics- Gonzacez, 2017:111). Absenteeism is caused by many factors, not only by students' possibly negative feelings towards school (Durfee, 2017). In cases where maintenance is not priority, (e.g. broken windows that are not replaced, or the structures not given adequate protection against environmental elements), learners as well as educators become uncomfortable in their environment and may be more susceptible to illness during the cold winter months (Durfee, 2017). Uline and Tschannen-Moran's (2008:35) study on the effect of climate and infrastructure found, "school climate plays a mediating role in the relationship between facility quality and student achievement". Additionally, a study by Cherrington (2017:72) indicated that overcrowded classrooms are one of the elements that contribute to absenteeism. For example, the authors asserted that if a learner suffers from a contagious illness, other children are more easily infected due to their close contact in overcrowded classrooms, which can result in absenteeism becoming a common phenomenon (Fobosi,2018).

2.3.4   The Cycle of Despair

Poor communities are characterised by schools with poorly maintained or lacking adequate infrastructure facilities (Parnwell, 2015:14). This situation is made worse by inadequate classroom equipment (Amsterdam,2010:4). The classroom environment should be well-equipped with furniture, such as desk and chairs (Cornell, 2018:124). If such basic equipment is inadequate, it affects learning, as learners find it harder to concentrate, which can lead to unruliness (Cornell, 2018:129).

Inadequate classroom equipment also underpins inequalities that are already engrained in the education system, with rural schools evidencing higher levels of inequality than their urban counterparts (Marishane, 2014:330). Schools in poor communities, and with related poor infrastructure, render challenges to learning and teaching processes (Buck & Deutsch, 2014:1139). In terms of rural schools, these challenges are emphasised by their failure to meet national academic goals, which means that many learners in these schools are denied access to quality higher education (Cespedes *et al*,2017:121). The myriad of components that are responsible for these challenges combine to maintain the *status quo*, including perpetuating poverty, high unemployment levels, high educator vacancies, and a lack of political will (Equal Education, 2016).

The greatest effect of poor performing schools in poor communities is the unending cycle of despair as illustrated in figure 2.2 (Khumalo & Mji, 2014). Cherrington (2017:73) paints a living picture of this despair by describing a typical school setting as including "realities of overcrowded classrooms, under resourced schools, and uninvolved parents". The cycle of despair consists of negative factors that give rise to additional negative factors (e.g. a rise in unemployment due to learners reporting poor academic performance, thereby not being fully equipped for the job market; or education dropouts returning to their communities and raising families without hope of educational betterment since their children attend the same poor schools (Khumalo & Mji, 2014:1521).

Figure 2.2: The cycle of despair

Source: Khumalo and Mji (2014)

Schools that have adequate facilities management processes tend to be located in suburban areas; parents of the learners in these schools pay higher school fees and, as a result, these schools can more effectively maintain their infrastructure (Equal Education, 2016). Conversely, parents in poor (rural) communities cannot afford school fees, which results in poorly maintained infrastructure (Buck & Deutsch, 2014:1142). Since facilities are not properly maintained, learners are challenged in their abilities to attend school daily (Muthoni, 2015:23). These rural schools are also usually overcrowded, and educators describe the working and learning environment as being highly stressful, which puts additional strain on the actual teaching process (Muthusamy, 2015:14). Learners also report experiencing poor concentration levels due to overcrowding (Muthusamy, 2015:20). Additionally, rural classes tend to be very unruly; leading educators to spend a great deal of time in maintaining order and noise levels and far less time on actual teaching (Buck & Deutsch, 2014:1141).

2.4   DESIGN AND MAINTENANCE OF INFRASTRUCTURE IN PUBLIC SECONDARY SCHOOLS

A study by Xaba (2012) concluded that maintaining school infrastructure and facilities is not viewed as an important factor of strategic planning in relation to academic performance. Facilities maintenance occurs predominantly in emergency situations (i.e. "as the need arises") (Xaba, 2012:215). Emphasis tends to be placed more on general cleanliness rather than on comprehensive and critical preventive maintenance (Xaba, 2012:215). According to the School's Act, 84 of 1996, the responsibility of maintenance lies with the school governing body (SGB).

Maintenance, along with clean and safe surroundings, create an atmosphere that is conducive to learning (Khatete, 2018:37).In a study performed by Amsterdam (2010:3), learners stated that littering, especially within the classroom space and on the school premises; graffiti on walls and desk; and the vandalizing of school infrastructure are some of the main infrastructure-related concerns that make the environment uncomfortable. Missing doors, or doors that are not able to close properly, were also found to be a negative factor with regard to maintenance (Amsterdam, 2010:3).

Properly designed and maintained school infrastructure assists educators to perform their work professionally and supports positive classroom dynamics (Warldron & Mcleskey, 2010). Yet, the maintenance of school infrastructure had not progressed in the past 5 years (Rinquest, 2018). The DoE and Public Works Departments were subsequently blamed for the poor delivery of school infrastructure (PMG, 2018). The Minister of Education, during the 2018 State of the Nation Address (SONA) called for the involvement of the National Treasury, the Department of Public Works, and other key interested parties to seek innovative means for the acceleration of infrastructure delivery (Polity, 2018).

The National Policy (2010) provides guidance on the structural designs of school buildings. The policy declares that architectural rules and norms must serve as guidelines for physical and structural designs that take into consideration the number of learners per classroom in both single-grade and multi-grade teaching settings (National Department of Basic Education, 2011). Designs must consider the minimum necessary space per learner that is conducive to dynamic teaching and the related

interactivity of learners. Furniture and equipment, and the minimum areas per specialised teaching room to permit the safe use of learning material and equipment should also be taken into account (Stosic, 2015:112). The designs must further make provision for minimum lighting, which includes artificial and natural lighting; good ventilation; and acoustics (Cheryan *et al.*, 2014:11). The travel distance between the chalkboard and seating areas should be set so as to ensure that learners can see the writing on the board (DoE, 2009). Most importantly, the construction of facilities and equipment must be durable (i.e. able to last a lifetime) (DoE, 2009). According to Wright, Mannathoko, and Pasic (2009:36) the main objectives of sustainable schools are to:

- Attract learners;
- Improve attendance rates;
- Improve retention and completion rates;
- Improve learning performance
- Provide a safe, inclusive, welcome environment for all learners;
- Provide enabling learning environment accommodating learners with disabilities;
- Involve parents and the community and
- Cultivate harmony between the school and its community

It is important to note that schools should not be designed merely for academic learning; rather, they should also be equipped to aid with and promote the overall development of the individual (Wright *et al.*, 2009). Therefore, effort must be made to establish a culture of learning and development, which can be greatly aided by school infrastructure that is conducive to the successful practice thereof (Wright *et al.*, 2009).

It is also necessary to remember that it is not only learners who suffer from inadequate infrastructure (Amsterdam, 2010:5). Educators also share a school's infrastructure with learners and suffer the same fates – sometimes even more than learners because teachers have to create a comfortable learning environment with inadequate equipment and infrastructure (Amsterdam, 2010:3).

2.4.1 Government policies that are in place for school infrastructure development

Basic norms and standards are rules that prescribe the infrastructural requirements that make a school a learning institution (National Department of Basic Education, 2010). These rules specify the basic standards for physical infrastructure to which every school setting must comply in order to function effectively (National Department of Basic Education, 2010). The specifications are legally binding, and all DoE officials need to comply with them (National Department of Basic Education, 2011). Norms and standards also offer a means to measure compliance and hold officials accountable; they function as both top-down and bottom-up accountability measures (Equal Education, 2013).

The policy related to school infrastructure (i.e. the National Education Policy for Equitable Provision of an Enabling Physical Teaching and Learning Environment) was formulated to establish physical teaching and learning settings for the effective delivery of learning and development as well as for initiating co-curricular activities (DoE, 2009). This policy comprises six strategies and two operational policy statements, as shown in Table 2.2 (DoE, 2009). The policy also consists of a set of guidelines for achieving its objectives; these guidelines embrace broad-based access for all, equality and reparation of past inequalities, and high standards of education based on national values (Marishane, 2014:326).

Table 2.2: The national education policy for equitable provision of an enabling physical teaching and learning environment: Strategic and operational statements

Statement No.	Policy Statement and Focus
1	Establishment of national norms and standards for an enabling environment. Focus: Setting national norms and standards for safety, functionality and enrichment and targets for adoption by provinces.
2	Systematised prioritisation of infrastructure needs. Focus: Standardising criteria and procedures for identification and the prioritisation of teaching and learning environment needs.
3	Planned development of an enabling environment. Focus: Preparing a strategic (long-, medium- and short-term) plan with objectives and targets, guided by recurrent mandatory planning instruments.
4	Standardised architectural designs. Focus: Developing prototype space norms and designs, guided by core sector policies such as physical access and substantive relevance.
5	Management and maintenance. Focus: Developing a policy on the management and maintenance of immovable assets.
6	Diversification of funding sources. Focus: Applying alternative funding mechanisms, regulated by the National Treasury and in line with relevant Constitutional provisions.
7	Demonstrated delivery capacity. Focus: Devolving responsibility, authority, and accountability to the school level accompanied by capacity building for implementation.
8	Systematised procurement management and procedures for the sector. Focus: Developing standardised sector-specific procurement procedures with procurement authority devolved to the lowest procurement level.

Source: South Africa (2010)

According to the South African Schools Act (SASA), 84 of 1996, regulations relating to minimum uniform norms and standards for public school infrastructure norms, include, amongst others, universal access, minimum classroom size, electricity, water, sanitation facilities, laboratories, libraries and sports fields. The regulations also include universal design standards, which state that provision must be made for special needs learners (South Africa, 1996a)

2.4.1.1 Universal access

Schools must be accessible to special needs learners (e.g. ramps should be provided for learners with wheelchairs) (South Africa, 1996a). Other provisions include handrails and parking facilities for disabled persons near the main entrances and most importantly providing every learner with equal education (South Africa, 1996a).

2.4.1.2 Minimum classroom size

The regulation of the SASA, No. 84 of 1996, makes provision for the sizes of classrooms to prevent overcrowding (e.g. each learner should be afforded 1.6m^2, and each educator, 7m^2) (South Africa, 1996a).

2.4.1.3 Electricity, water, and sanitation

Classrooms must have natural lighting, which means that windows must be present in all classrooms (South Africa, 1996a). Natural lighting must be complemented with artificial lighting. Adequate clean water must be in consistent supply and ablutions must be available for both males and females (South Africa, 1996a).

2.4.1.4 Supportive infrastructure

Laboratories, libraries, sports fields, and playing fields must be present for recreation at all schools (South Africa, 1996a)

2.4.1.5 Universal design

The school environment must create an atmosphere of safety and security and should not be located near places that have excessive noise (Cheryan *et al*,2014:6). Construction materials used to build the school must be hazard-free and construction should meet the stipulated National Building Regulations standards (South Africa, 1996a).

The national policy on the equitable provision of physical teaching and learning environments, as well as the national education infrastructure management system (NEIMS) tool should implement an acceptable school infrastructure that can promote learner performance (Marishane, 2014:327). The DoE (2009) proclaims that its primary duty is to administer and drive actual implementation of and compliance with set national norms and standards. This duty is best performed when schools are

consistently monitored and evaluated, as well as when the evaluation of the implementation of norms and standards indicates that they have the intended outcomes. The NEIMS is a database that contains information school backlogs and is utilised in planning and managing the process of school infrastructure. The NEIMS-based information is readily available in real-time, and relevant data regarding the conditions of infrastructure and facilities are, thus, easily accessible (Department of Education,2017). NEIMS can provide interested parties, such as the government, with the ability to calculate and identify school infrastructure backlogs and plan accordingly in order to eradicate sub-standard infrastructure, renovate those that are not in disrepair, and build new schools where necessary (South Africa, 2007).

2.5 THE RESPONSIBILITY OF THE DEPARTMENT OF EDUCATION IN TERMS OF INFRASTRUCTURE MAINTENANCE

The responsibility of the DoE is clearly spelled out in the subsequent legislation: Section 38(1)(d) of the Public Finance Management Act (PFMA), No. 01 0f 1999 specifies that the accounting officer for the Department is accountable for the administration, as well as the preservation and upkeep of the properties and infrastructures of the Department. Another regulation pertaining to assets is the Government Immovable Asset Management Act (GIAMA), No. 19 of 2017, which supports the proficient use, occupation, and maintenance of immovable assets (Section 5(1)(d), South Africa, 2012).

The SASA, No. 84 of 1999, breaks the responsibilities of the DoE down into clearly defined borders. These responsibilities are listed from top to bottom, indicating the responsibilities of each of the following: the province, the district, the circuit, the SGB, and the school principal. The Act further states that the maintenance, repair, and refurbishment of school infrastructure (i.e. property, grounds, hostels, and other places) utilised by the schools fall under the domain of the DoE (South Africa, 2012). School facilities administration, management, and maintenance are, then, handed over to the following lower authority levels (South Africa, 2012):

1. The school principal and SGB;
2. The circuit and/or district authority; and
3. The Provisional Infrastructure Directorate (PID).

In practice, the principal requests funding from the DoE; the request can be forwarded to the circuit or district authority (South Africa, 2012). This authority, in turn, applies to the PID for funding (South Africa, 2012). The PID must then 'negotiate' funding with the National Treasury, which has a set of criteria for awarding funding (South Africa, 2012). Thus, provincial department officials must have the necessary capacity to negotiate funding and, when funding is awarded, these funds must be efficiently managed and sent to the requesting school in order to negotiate additional funding for future projects (South African, 2012).

Another important point to consider with regard to facilities maintenance is that it is not a simple process of merely 'fixing' broken infrastructure (Majela, 2013:23). Rather, the challenges such as non-functioning sanitation facilities start well before maintenance can be considered (Majela, 2013:23). School governing functions, as guided by the SASA (South African,1996b) are complex practises that require specialist skills and expert knowledge such as conflict management, planning and monitoring in order to be implemented effectively.

In a study performed by Xaba (2011), the author discovered that schools which are properly maintained usually boast experienced principals who have gained knowledge about maintenance by means of trial and error. In other cases, the maintenance of these schools falls under the management of a third party (e.g. a specialised facility maintenance company), or an internal body that is exclusively responsible for maintenance (Xaba, 2011:205). It should be noted that internal bodies do not always have the expertise for certain types of maintenance, in which case, third parties also become involved (Majelo,2013:30) Internal committees can also be problematic in cases where assessments are made of infrastructure and judgement calls are required (Barrett, Treves, Shmis, Ambasz & Ustinova, 2019:21). For example, in the case of the aforementioned Hoërskool Driehoek tragedy, the internal 'assessors' inspected the bridge on a monthly basis, yet they could not (or did not) notice defects (Dlamini, 2019).

Thus, it is vitally important for facilities maintenance to be conducted by experts. The lack of experts was highlighted by Xaba (2011:208), who discovered that maintenance functions are often not structured (e.g. the inspection of infrastructure is not always conducted according to set timeframes, and preventative maintenance is often not

considered). The author found that maintenance was generally only performed when infrastructure was broken and in dire need of repair (Xaba, 2011:209). Another finding from Xaba's (2011:209) study revealed that the maintenance staff at schools consist primarily of the school gardeners or general workers who fix basic infrastructure; however, specialised maintenance (e.g. electrical repairs) tends to be outsourced. The author noted that general workers are usually not skilled to do comprehensive maintenance, which places learners and educators under various, unnecessary, and undue risks (Magoni, 2019:55).

It should be noted that the SASA (No. 84 of 1996) makes provision for the development of SGB members by promoting that introductory training be offered to newly elected members as a means to equip them to execute their functions. Similarly, the Act states that continuous training must be offered to further encourage the effective performance of SGBs, as well as their adherence to the Act. However, these allowances within the Act do not guarantee that the SGBs will become proficient in facilities management.

Facilities maintenance is clearly defined as the responsibility of the principal and related SGB of any given school (Adamu, 2019:199). However, research indicates that facility school management would be better served if it were conducted by a higher authority (Barrett *et al*, 2019:23). Part of the issue related to generally poor facilities maintenance is that the extent of the responsibilities of facilities maintenance is broad in practice. It is necessary, therefore, to establish clearer frameworks and boundaries detailing where the responsibilities of the principal and SGB of a school begins and ends (South Africa,1996a). For example, boundaries could define that when a roof needs to be repaired, it is the responsibility of the school's administration, but when an whole building needs upgrading/replacement.

2.5.1   Maintenance Funding

As noted previously, it is the responsibility of a school's principal to negotiate extra funding; the DoE allocates a certain amount of funding to schools, but in most cases, these funds do not cover all maintenance requirements (Nakoa, 2019). Department-allocated funds are mostly target specific, which means that the funds can only be used for maintenance, while other funds from the DoE may not be directed to

maintenance (Xaba, 2012:219). It is, therefore, necessary for school administrations to raise the extra funds themselves (Hobbis, 2019:749)

It should be noted that fundraising is not a simple matter and fundraising campaigns cannot be left solely to schools' administration to run (Magoni, 2019:59). In suburban schools, parents often pay a monthly school fee, the funds of which can be used for maintenance; however, in township schools, the parents are mostly unemployed and cannot afford to pay school fees and these fees would assist with school maintenance but secondary schools get sponsored and use fundraising for the upkeep f the school (Hobbis, 2019:750). Adequate infrastructure must come before development programmes (Barrett *et al*, 2019:17). Learner development programmes depend on an atmosphere that is conducive to learning, and inadequate infrastructure arrests development (Amsterdam, 2010:5).

2.5.2   The Nature and Scope of Facilities Maintenance

As noted previously, school facilities maintenance is defined as a process which includes the reparation, replacement, refurbishment, and overall preservation of physical structures and features of a school (Xaba, 2012:219). Such maintenance includes the actual school buildings, grounds, equipment, fixtures, and safety mechanisms (Xaba, 2012:219). Grasmick, Hall, Collins, Maloney, and Puddester (2008) describe maintenance as a process focussed on the establishment and maintenance of safe conditions for the occupiers of facilities. In the case of school facilities, the occupiers would include the learners, teachers, administrative staff, parent, and/or visitors (Grasmick *et al.*, 2008).

With regard to school facilities, the focus of facility maintenance is the creation of a physical environment that adheres to the principles of appropriateness and adequacy related to educational institutions (Xaba, 2011:205). Facilities maintenance is further described as the integration of available resources with a specific goal that creates an enabling environment (i.e. an environment which is conducive to learning and teaching) (Nakoa, 2019). Thus, facilities maintenance aims to establish an environment that is inviting, comfortable, and amenable to educational activities for the promotion of productivity (Grasmick *et al.*, 2008). These facilities should promote quality environments with existing resources and infrastructure to encourage academic performance (Grasmick *et al.*, 2008).

2.6   AN OVERVIEW OF THE PRESENT STATUS OF SOUTH AFRICAN SCHOOL INFRASTRUCTURE

In 1998, the South African government committed itself to intensifying its efforts regarding infrastructure development, with emphasis placed on eradicating inadequate infrastructure (Ronnie & Boyd, 2019). More than 21 years later, instead of achieving this goal, the government has reported an increasing backlog (Skelton, 2015). Also in 1998, the DoE introduced the National Norms and Standards for School Funding. This policy was established precisely for the eradication of backlogs (Department of Education,1998). Then, in 2004, the then president of South Africa, Thabo Mbeki, promised the country that, by the same year end, not a single learner would be learning in inadequate learning environment (Magoni, 2019:54). Yet, by 2012, the DoE had to acknowledge that there was still backlog of 510 structures that were unsuitable for schooling, 2 401 schools with no access to water on their premises, 3 544 schools with no electrical systems, and 913 schools with no sanitary facilities (Parliamentary Monitoring Group, 2015). However, according to the 2017/18 National Education Infrastructure Management System (NEIMS) Report, 269 schools in South Africa lack electricity. There are 8,702 schools with pit toilets nearly half have installed new toilets but have yet to decommission the old dangerous ones (Yates,2018).

Furthermore, Yate (2018) states that thirty-seven schools have no sanitation facilities whatsoever, 7,816 South African schools are without piped water. While seventy percent of schools do not have a library, and eighty-one percent do not have a laboratory

The National Department of Basic Education formulated its policies in 2010. These policies emphasised that the upkeep of schools should be done in a manner that enhances the teaching and learning processes (National Department of Basic Education, 2010). However, problems have persisted in terms of many schools still experiencing continued unsafe environments that lack properly maintained infrastructure, resources, and general suitability for learning and teaching (Phakathi, 2019). As of 2015, the challenges seem comprehensive and have become a daunting task to address (Skelton, 2015).

Abdoll and Barberton (2013) projected that schools with inappropriate infrastructures would most likely be eradicated by the year 2023 or 2024. Yet, many children still learn in unsuitable schools and must endure adverse conditions despite waiting many years for basic infrastructure that could render these school as decent places of education (Yates, 2018). One example of schools waiting for upgrades is the case of a school in the Eastern Cape, which has been under construction for the last 10 years due to budget shortages (PMG, 2018). The PMG (2018) report also revealed that most of the provinces have not met their allocated funds, which means that there is a huge gap between funding provided and ultimate performance. Equal Education (2019) state that Provincial and national government's data on school infrastructure continues to be inconsistent on the implementation of the regulations, including detailed backlog analysis, costed short, medium- and long-term plans, details on provision and maintenance of infrastructure.

2.6.1   Challenges Pertaining to Infrastructure Upgrading and Maintenance

Since information related to schools' infrastructure spending is not readily available in the public domain, the Centre for Child Law gave a directive to Cornerstone Economic Research to launch a study to determine the progress of infrastructure spending and delivery (Abdoll & Barberton, 2013). This report discloses that poor delivery in relation to school infrastructure backlogs is commonplace – only four schools were completed in the first financial year (2011/12) and 12 the following financial year (2012/13) (Equal Education, 2016). The report further found that while it was expected that a lack of funding would be the main reason for the poor delivery, a lack of finances was not the issue (Equal Education, 2019).

Funding allocated for education in the 2011 to 2013 period amounted 5.9% of the overall GDP (Abdoll & Barberton, 2013). Even more significant was that international recommended standards suggested by the Organisation for Economic Cooperation and Development (OECD) is 54% education budget (Abdoll & Barberton, 2013). In addition to the original amount of R8.2 billion, which was set aside for the improvement of school infrastructure over the studied period, the government added additional education funding, totalling R13 billion (Abdoll & Barberton, 2013).

The R13 billion formed part of the 2012 medium-term expenditure framework of three years and was also not the only funds available for infrastructure (Abdoll & Barberton,

2013).Additionally, the R13 billion was assigned specifically for addressing infrastructure backlogs and was, thus, a provisional grant managed and administrated at a national level (Abdoll & Barderton, 2013).

It should be noted that provinces' spending regarding school facility maintenance is generally efficient, except for the Eastern Cape, which reports the most inadequate school infrastructures (PMG,2015). Eastern Cape schools also report the poorest correlation between spending and outcomes (Abdoll & Barderton, 2013). The PMG (2018) hearing, 5 years after the Cornerstone Economic Research report was published, again confirmed that there is still a current gap between spending and infrastructure progress in public secondary schools. In other words, the DoE was not able to improve on performance and infrastructure delivery over a 5-year period. A further indictment is that the PMG report of 2018 declared that there was a shortage of dependable data related to existing infrastructure, which implies that the DoE cannot state with any real certainty the exact amount of inadequate infrastructure still to be addressed.

When the amounts mentioned in the PMG (2018) report are added to the Accelerate Schools Infrastructure Delivery Initiative programme, which states that of its 367 projects, 202 have been completed.

The PMG (2018) report concluded that the National Department of Basic Education underspent on school infrastructure backlog grants for two consecutive years. In 2011/12, the expenditure was calculated at just over 10%, and only 23% in 2012/13 (Equal Education,2016).The Accelerate Schools Infrastructure Delivery Initiative (ASIDI) target over this same period (i.e. 2011-2013) was 49 refurbishments of inadequate school infrastructure (Equal Education,2016). However, only 10 schools were completed by the conclusion of the first year (Equal Education,2016). According to the Department, various factors led to their failure, including adverse weather conditions, and the procurement of builders and contractors being hampered by stringent procurement policies (DoE, 2009).

Abdoll and Barberton's study (2013) found that other reasons for the underspending were also applicable. These factors included a lack of capacity within the Department, as well as poor strategic planning and management of the infrastructure programme

(Abdoll & Baberton, 2013). The authors concluded that the Department was overwhelmed by the nature and size of the project (Abdoll & Baberton, 2013).

Based on these findings, it may be necessary for the DoE to be pressurised by civil society to redesign its procurement processes and structure its contracts in such a way as to involve the major construction organisations to perform the work directly or make it easier to subcontract work to SMMEs (Singh & Stuckelberg, 2017). The capacity of officials also needs to be developed, or subject matter experts should be consulted for assistance in larger projects Singh & Stuckelberg, 2017). Another challenge that needs addressing is that in many cases where funds are utilised for grand infrastructure development, the primary motive is often not the benefit of learners or the creation employment but rather to initiate deals that involve the private sector in order to engage in corrupt activities to divert funds and resources of the state to government officials as opposed to the intended recipients (Singh & Stuckelberg, 2017).

2.7 POSSIBLE SOLUTIONS TO THE INFRASTRUCTURE ISSUES

Due to the lack of implementation of norms and standards, as well as a proper framework that acts as a base measurement for assessment of infrastructure and facilities management problems, it is not clear what the crux of the problem of translating infrastructure requirements into practice really is (Equal Education, 2019). There is, therefore, a need for a proper assessment of the nature of the problem and the types of infrastructure needs (PMG, 2019). It would also help to grade the different levels of inadequate infrastructure, thereby prioritising work accordingly and, where necessary, rebuilding and renovating structures that are not adequate (Skelton, 2015).

Civil society organisations should make use of the Bill of Rights contained in the South African Constitution (1996), which describes justiciable rights. These laws are a valuable tool to hold Government to account when it fails to deliver on promises, as set out in the Constitution and, consequently, the government can be brought before the courts to give account for cases of failure to meet prerogatives (Equal Education, 2019). In terms of claims made by Government as to a lack of proper strategic planning, incapacity, and an inability to act on targets and agreed upon plans, as well as a lack of resources are not, from a purely legal perspective, justifiable defences for the violation of children's right to basic education (Fobosi, 2018). Proper evaluation

and monitoring of outcomes must also be instituted in order to encourage accountability (Skelton, 2015).

Since civil society is left with few alternatives, Government has been brought before the courts, with some success (Skelton, 2015). Some cases have been presented that dealt with poor delivery of infrastructure, while others were with regard to the provision of learning materials (Fobosi,2018). Still other cases, brought about by Equal Education (2016), involved addressing the unavailability of educators and non-teaching staff.

The Legal Resource Centre, a civil society organisation that acts on behalf of the Centre for Child Law and seven public schools, started legal procedures against the National Department of Basic Education. The legal procedure included a comprehensive affidavit which outlined the unacceptable state of some of the public schools, coupled with a declaration of the motion detailing compulsory corrective steps. The counter action of the Department included an opposing affidavit; however, the Department ultimately offered a settlement (Abdoll & Barberton, 2013). It was this action that led to the establishment of the Accelerate Schools Infrastructure Delivery Initiative [ASIDI]. The two parties signed an agreement, where the National Department of Basic Education committed to an implementation plan for addressing the infrastructure backlog.

In April 2013 the number of schools was adjusted to 510 (National Department of Basic Education, 2013). Thus, it can be concluded that the litigation brought about the desired result, namely, to move Government into action. However, the question remains as to whether or not the National Department of Basic Education will implement the ASIDI initiative. This calls for the monitoring and evaluation of the processes related to implementation, including budgeting, spending, procurement, and construction, preferably with transparency mechanisms put in place, which can allow for public scrutiny (Equal Education, 2019).

Another action that can be taken to pressurise the Department is through SGBs, education advocates, and activists forming alliances to offer a united front for address the shortcomings in the current education system (Mohapi & Netshitangani, 2018:5). Such alliances could include sharing ideas, discovering innovative initiatives, and

learning new skills to hold the government accountable (Mohapi & Netshitangani, 2018:8). A necessary feature to adopt in such alliances would be to have systems and procedures in place to ensure that promises made in terms of education are delivered and that the Department meets its obligations in terms of upholding the right of children to education (Cherrington,2017:73). These collaborations and partnerships should consist of professionals, including, for example, attorneys, economists, procurement professionals, and infrastructure experts (Skelton, 2015). It is also advisable to strengthen the capacity of the lower levels of school administration (e.g. SGBs), since they have a responsibility to maintain the acquired infrastructure and facilities at the school level (Nakao,2019). In terms of facilities administration and maintenance, the following should be instituted:

Maintenance organisation. SGBs must create an organisational structure for facilities management (Department of Basic Education,2018). This process should involve classifying and defining roles, responsibilities, and duties in terms of the nature and type of maintenance, coupled with clear guidelines and standards for maintenance according to the needs of the individual schools (Elghaffar, 2007:60; Mohapi & Netshitangani, 2018:8). As noted previously, facilities maintenance is one of the responsibilities of SGBs and, as such, they must put in place a maintenance committee to effectively practice this function (Department of Basic Education,2018). The committee could carry the responsibility for ensuring that the organisational structure is actually implemented and then guided by the structure in terms of scheduled and unscheduled maintenance and repairs, liaising with communities, initiating fundraising campaigns for maintenance tasks, and educating the surrounding community on their role by taking ownership and safeguarding school infrastructure (Mohapi & Netshitangani, 2018:8 and Wakeham, 2003:5).

The committee. The committee would be responsible for scheduled maintenance inspection (Department of Basic Education,2018. In terms of expert assessment, the committee should procure the services of experts to ensure that the physical environment is safe and free from health risks (Mohapi & Netshitangani, 2018:11). This plan must be elaborated by means of data collection about facilities maintenance requirements which would form the basis for the overall maintenance programme (Department of Basic Education,2018. These programmes, in turn, should contain sets

of inspection checklists for the various physical structures, including roofs, furnishings, playing fields, and services systems (Bastidas, 1998).

Maintenance planning. Planning must have an objective that utilises existing resources and infrastructure to their maximum capacity while simultaneously reducing the cost of resources restricted to grounds and buildings (Scottish Executive, 2003:7). Maintenance planning invariably includes maintenance policy formulation and aspects of maintenance funding (Howard, 2006; Priestly, 1997:12).

School facilities maintenance is a demanding function and its implementation requires suitable knowledge and skills; thus, it is imperative to seek experts to help in certain cases (Department of Basic Education,2018). Since SGBs are closer to the community, as opposed to the government, it should be the responsibility of the SGBs to educate their communities to take ownership of the schools and encourage them to contribute in terms of protecting school infrastructure (Mohapi & Netshitangani, 2018:11 and Xaba, 2012:223).

2.8   CONCLUSION

The government is obligated in terms of the Constitution (1996) to provide an environment that is in line with the requirements of the Bill of Rights pertaining to children's right of education. Yet, currently, the rights of many children in terms of education is being violated due to a lack of infrastructure, inappropriate school facilities, and poor maintenance of facilities that disadvantage their learning and teaching processes. The result is that many learners' academic performance is compromised.

This negative schooling situation is especially prevalent in poor communities and is even further escalated in rural areas; hence leading to inequality in education. However, this is not the only impact. In extreme cases of unmaintained and poor infrastructure, children have died from using pit latrines, or experienced continuous poor health due to school structures that do not offer sufficient protection against environmental conditions. A further example can be seen in how, due to ineffective inspections of infrastructure, a bridge collapsed at Hoërskool Driehoek, killing and injuring several learners. Such incidents should move people to greater action, yet the

continued prevalence of poor school facilities indicates that the political will to deliver services are not a primary concern for officials.

As early as 1998, the government promised to eradicate inappropriate schools, yet 21 years later, the backlog has still not been eradicated. The process is fraught with challenges that form barriers to service delivery, and the only seemingly effective solution has been civil litigation against the DoE to address the backlog. The stagnation of the government in improving schools serves to feed the cycle of despair, where communities are left to their own devices to maintain their schools, and learners are kept within poverty cycles since they are not afforded the opportunity to be developed into productive citizens.

The reviewed literature indicates that the current situation could be effectively addressed if the government is held accountable by civil society and organisations that unite to form partnerships aimed at pressurising Government and holding officials to account. However, monitoring the progress of Government initiatives must also be done to better ensure that service delivery takes place and at the desired pace.

CHAPTER 3

RESEARCH METHODOLOGY

3.1   INTRODUCTION

This chapter outlines the research methodology employed in this study. The data sources used in this report were obtained using quantitative research by means of a questionnaire. This chapter notes the data collection processes and instruments that were used to gather information, as well as the administration of the instruments and the data analysis procedures.

2.2   RESEARCH APPROACH

It is best to do research according to a plan (Banerjee & Chaudhury,2010:62). A research design refers to a plan that outlines the steps followed in a research project in order to attain answers to a researcher's questions (Mugenda & Mugenda, 2010). For this research, two main methods of research were considered, namely quantitative or qualitative research. Quantitative research gains information presented in and with respect to amounts, values, or statistics (Bryman, Bell, Hirschsohn, Du Toit, Van Aardt & Wagner, 2014:350) . This kind of data is quantifiable (i.e. it can be objectively measured or calculated) (Yilmaz, 2013). Quantitative information can be displayed as tables and/or graphical illustrations (Yilmaz, 2013).

Conversely, qualitative research gains information that is empirical or directly observable (Jebreen, 2012:163) . The information is not quantifiable; instead, a researcher observes a certain behaviour or event and then interprets the data, often thematically (Jebreen, 2012:163). Qualitative data are usually obtained from respondents in their natural environments (e.g. a researcher may observe employees performing a task at their workplace in order to make deductions or interpret the phenomenon so as to gain a better understanding thereof) (Creswell, 2009). Qualitative studies are also usually interested in highlighting and interpreting the meanings, opinions, and experiences that people may have in relation to a given phenomenon (Creswell, 2009).

The intention of this study was to identify information by accruing numerical data that could be converted into suitable statistics from which conclusions could be drawn.

Such statistical data would not be gained using qualitative research methods. The quantitative method enabled the quantification of learners' opinions, perspectives, and attitudes in terms of the effect that inadequate school infrastructure has had on their academic performance. Another factor that could be measured using quantitative methods was the influence of health and safety on learners' academic performance. These data could then be presented in tables and graphs so as to offer a holistic picture of the issue (Yilmaz, 2013).

3.3   RESEARCH DESIGN

The intention of this study was to follow a descriptive quantitative approach in order to discern the issues pertaining to the topic. A descriptive approach offered the opportunity to gather and present statistics with which to describe the findings (Nassaji, 2015:129). Descriptive data also assisted with describing the present state of affairs at the three secondary schools in Motherwell in Port Elizabeth that formed part of the study. A descriptive survey was employed to extract the required data. A descriptive survey research design extracts information directly related to the prevailing status of a phenomenon and has been found to be reliable for obtaining valid general conclusions from existing evidence (Wagner, Kawulich, & Garner, 2012).

3.4   DATA COLLECTION

3.4.1   Population

The population of a study is a critical part of research; it assists a researcher to target the appropriate group which can deliver the data required to answer the research questions (Banerjee & Chaudhury, 2010:61). According to Alvi (2016), a population is the complete unit of subjects, objects, events, or factors investigated. A population may consist of individuals, groups, events, or elements (Alvi, 2016).

The target population for this study included all participants who met the specific norms identified for the research project. Specifically, the population consisted of Grade 11 learners from Mfesane Senior Secondary School, Masiphathisane Senior Secondary School and Douglas Mbopa Senior Secondary School based in Motherwell in Port Elizabeth. The study used grade 11 learners because grade 12 weren't available due to examinations and grade 11 learners was the second option because learners have been schooling specific school for a number years to see infrastructure progress. Due

to the target group being sufficiently large, simple random sampling was used to gain a sample of the greater population by selecting learners randomly from within the population.

3.4.2   Sampling

Sampling involves selecting a group of people, events, behaviours, or other elements from within a larger population with which to conduct a study (Martínez-Mesa, 2016). A sample is a smaller part or subsection of partakers drawn from the whole or target population (Martínez-Mesa, 2016). This study made use of probability sampling; specifically, random sampling (Martínez-Mesa, 2016) . Random sampling refers to a variety of selections techniques in which sample members are selected by a chance (Nyagosia, 2011)

For the purpose of this study, data were collected at three public secondary schools in Motherwell in Port Elizabeth. The choice of these three schools was based on the following criteria: All three schools 1) started platooning from primary schools before they had their own infrastructure; and 2) were first built with prefabricated materials. One school still operates in prefabricated buildings, even after 20 years, and is only now under construction for new facilities. The other two schools were built in the 1980s and have had renovations conducted within the past 5 years. 3) The schools were easily accessible to the researcher. It should be noted that it was not feasible to include all the high schools in the area as there were not enough resources to cover all the schools. 4) The three schools are located close to one another, which made them financially feasible options (e.g. reduced travel costs) and assisted with time management when collecting the data. The data collection period was less than a year, which further made conducting research at more than three schools unfeasible.

3.4.3   Simple Random Sampling

Researchers can choose between non-probability and probability sampling techniques (Alvi, 2016). Non-probability sampling is used in instances when a research population has knowledge that provides a greater understanding of the research problem (Alvi, 2016). Probability sampling, on the other hand, guarantees that the chosen sample is representative of the population as a whole (Martínez-Mesa, 2016). In probability sampling, each element in the population has a known, non-zero chance of being

selected through the use of random selection procedures (Elikan, Musa, & Alkassim, 2016:2).

3.4.4   Sample size

The three schools chosen for this study have a total of 750 Grade 11 learners. From this total, a representative sample was selected using simple random sampling. In order to define a sample size, an online calculator, Qualtrics (2019), was employed. The aim was to gain a 90% confidence level and a margin of error (i.e. confidence interval) of 6% from the population of 750 learners. The final study sample size based on the Qualtrics (2019) calculations amounted to 151.

3.4.5   Primary Data

The collected data were divided into primary and secondary methods of data collection. According to Creswell (2009), primary data consist of information collected by a researcher to conduct research assignments. This is information that no other person has previously gathered, compiled, and/or published in an accessible public domain (Creswell,2009) .

3.4.6   Secondary Data

Secondary data refers to data which have been collected and analysed by someone else (Woods & Ross-ker, 2011:119). Secondary data may either be published or unpublished data (Kumar, n.d.). The secondary data obtained in this study were used to inform the research. The data were obtained from various sources, including peer-reviewed journals, articles, books, completed research, newspaper articles, and various internet sources. The secondary data predominantly contributed to the formation of the literature review.

This study made use of both secondary and primary data to conduct the research. The primary data of this study consisted of information collected from structured questionnaires (Appendix L). The questionnaire was delivered personally to the participants. Provision was made to ensure clarity of the questions' meaning by having the researcher present when the participants filled out the questionnaire; thereby being able to offer verbal clarification to participants who may have been unsure of some of the questions.

3.4.7   Instrument Design

A guided questionnaire is a questionnaire that is given to a respondent for completion and is then returned to the researcher (Mathers, Fox, & Hunn, 2007). Usually, the researcher is present while the respondents complete guided questionnaires in order to clarify the meanings of questions if and when required (Mathers *et al.*, 2007). It is important for researchers using this instrument to consider the merits of the questionnaire as a method of data collection as well as its possible drawbacks in order to be prepared for any eventualities that may affect the research negatively (Jebreen,2012:165).

It has been established that questionnaires are very effective for gathering data to determine public opinion regarding a phenomenon (Elikan, Musa & Alkassim, 2016:2). Questionnaires are also known to bring out true responses from respondents because of the anonymity that respondents are given through this instrument (Elikan, Musa & Alkassim, 2016:2). This instrument has further been described as a useful means of gaining independent and equalised opinions (Hutchinson, 2006:55).

Questionnaires are convenient in that they can be completed according to respondents' available timeframes (Hutchinson, 2006:56). However, one disadvantage related to questionnaires is that, due to the anonymity of respondents, it may be possible for respondents to give dishonest and inaccurate information, which can negatively affect research results (Hutchinson, 2006:56). Another disadvantage is that questionnaires can be expensive and can take up a lot of time to manage (Hutchinson, 2006:56).

After considering all the characteristic of questionnaires, the instrument was chosen for data collection in this study. This decision was made based on who questionnaires were the most cost-effective and least time-consuming data collection method for gaining information from the large study sample.

The questionnaire consisted of five sections (Appendix L):

Section A consisted of questions related to respondents' demographic background and included factors such as gender, age, home language and number of years in the institution.

Section B consisted of various questions regarding the effect of infrastructure on learners' academic performance.

Section C captured participants' views on insufficient health and safety measures and their impact on learners' academic performance.

Section D consisted of questions related to the influence of infrastructure maintenance on learners' academic performance.

The **General Section** at the end of each section allowed respondents to add any further information to the research. This assisted elaborating on the hypotheses.

A 5-point Likert-type scale was used in the questionnaire.

Instrument administration

The questionnaire administration will be undertaken in the following phases:

Phase 1: An attempt will be made to obtain an ethical clearance from NMU research committee.

Phase 2: An attempt will be made to obtain access to three public secondary schools in Motherwell in Port Elizabeth.

Phase 3: Writing consent letter to the Department of Education, school principals, SGB and grade 11 parents.

Phase 4: Complete the design of the pilot questionnaire.

Phase 5: Pre-testing the questionnaire to obtain ideas to increase the credibility of the questionnaire.

Phase 6: Type the layout of the questionnaires.

Phase 7: The researcher will deliver the consent letters and ethical clearance to the randomly selected sample.

Phase 8: A reminder call/email will be sent to the principals to remind the rest of the target pollution bring the signed consent letters.

Phase 9: The respondents will be given the questionnaire in person and it will be explained to them step by step. Once the participants are done answering the survey. The completed questionnaire will be collected and the raw data will be converted into Excel spreadsheet and analysed in line with the data analysis procedure.

3.5   RELIABILITY AND VALIDITY

It was important for this study to deliver results that could be deemed reliable and valid. In order to achieve reliability and validity, guidelines contained in the literature were followed in order to ensure that the research was properly conducted. Specifically, it was necessary to ensure that the research instrument contained valid and reliable measurements in order to deliver quality research findings (Anney, 2014:272). A research instrument is deemed valid when "…the instrument reflects the abstract construct being examined" (Burns & Grove, 2001:814). Questionnaires are known to, generally, deliver valid and reliable measurements (Taherdoost, 2016:31), and the questionnaire used in this study was tested using pilot study for reliability before application. The results of the tests are discussed in Chapter 4.

Credibility refers to the confidence that researchers have that their data were interpreted correctly and that the conclusions made from this data corresponds with the information received from respondents (Taherdoost, 2016:32). In order to ensure credibility, a researcher can make use of triangulation to ensure that the information received and the findings/conclusions made correspond (Taherdoost, 2016:32). Triangulation was practiced in this study by means of comparing the information received from the different respondents from the three different schools so as to determine if there were any repetitive patterns across the data. Raw data were also compared to the findings and conclusions to ensure correspondence. Chapter 4 offers a description of this exercise.

3.6   ETHICAL CONSIDERATION

The researcher obtained an ethical clearance from the Nelson Mandela University's research office in order to be able to conduct research with learners. Due to the researcher's limited experience conducting research, an experienced supervisor assisted with guiding the research process and ensuring the research was conducted in an ethical manner. McDermid, Peters, Jackson, and Daly (2014:32) state that

participants must give consent for the collection, use, disclosure, and storage of personal information that is identified or potentially identifiable within or during research. Therefore, for this study, potential respondents were presented with consent forms describing the type of study; the purpose of the study; and the rights of respondents, with special emphasis on respondent confidentiality and their right to withdraw from the study at any time (Appendix H). A parental consent letter was also sent out for learners under the age of 18 (Appendix H). The parental consent form was also written in their home language, and only learners whose parents returned their consent were considered for participation. These learners were then given a consent form to fill in for participating in the study.

Research data should be kept confidential and protected at all times (Connelly, 2014:55). Participants have the right to privacy and confidentiality (Connelly, 2014:55); therefore, in this study, respondents' names were not required to appear on the given questionnaires. Risks that could be harmful to the participants,schools and communities were also avoided, and the data collected was reported in an unbiased way. Findings were, however, presented in a way so as not to negatively affect the schools' reputations or the community.

The following risks were considered, and measures were undertaken to mitigate them: 1) risk of offence towards the selected schools was considered. The researcher reported data collected from the selected schools in a non-biased way, and the report was written in a respectful manner in order for the final findings not to be negative towards the schools and community. 2) Possible risk of stigmatisation of the selected schools was considered, and derogatory terms were not used to describe the schools or the stakeholders. 3) Risk of invasion of privacy while collecting questionnaire data was considered. In order to maintain participant privacy, overall rather than individual results were presented. Each questionnaire was also referenced using an allocated number and the names of participants were not used. Data were collected in a way so as to afford respondents anonymity and confidentially, and the results are not published publicly. Only the researcher collected and interpreted the questionnaires; no third party had access to the raw data.

3.7   DATA ANALYSIS

Data analysis involves organising data into a framework and (as in this study) descriptive statistics can be used to present the measures of central tendency (Wood & Ross-Kerr 2011:125). Data obtained in this study were processed and analysed manually as well as through the use of Microsoft Excel for coding data and calculations. The researcher interpreted and organised the data using coding and descriptive statistics in the form of frequencies, mean scores (n), and standard deviations, and the results are displayed using Tables and Figures in Chapter 4.

3.7.1   Coding structure

Processing was conducted by means of Microsoft Excel. Coding comprised of assigning a value to each of the answers provided by participants to the closed-ended questions or assigning a code to the answers of open-ended questions. It was determined that coding through means of a computer was quicker than attempting to code hard-copy responses (Woods & Ross-ker, 2011:120). The questionaires were sent Computer coding also ensured that the data processing would be well-organised (Woods & Ross-ker, 2011:120). Coding helped with data analysis by classifying and arranging the given answers into ordered units that revealed the frequency of the ranges; these ranges could then be calculated (Theron, 2015:9).

3.7.2   The Mode

The mode is the observation in a dataset that appears the most frequently (Lombaard, van der Merwe, Kele, & Mouton, 2012:62). In this study, the mode was applied to identify the most observed demographic-related aspects as well as the importance of school infrastructure.

3.7.3   The Mean

The mean is the arithmetic average of a group of data (Lombaard et al., 2012:61). The mean in this study was applied to determine the average score of respondents' perceptions on the effect of infrastructure development on learners' academic performance in public secondary schools. The score was then used to determine whether the mean and mode were correlated.

3.7.4 Standard deviation

Standard deviation, which represents the spread of observations from their mean, was interpreted as follows (Lombaard et al. 2012:71):

- > 0.00 ≤ 1.00 Responses are very closely grouped together.
- > 1.00 ≤ 2.00 Responses are closely grouped together.
- > 2.00 ≤ 5.00 Responses vary and are not closely grouped together.

3.7.5 Demographics

The data collected in this category were analysed by using, mostly, mean percentages and bar charts to display the various demographic information of the respondents. This section was additionally used to test the validity of respondents' answers.

3.7.6 Hypothesis 1 School Facilities

The variables in this section were ranked according to the means of participants' responses related to school facilities. Questions in this section required respondents to rate the importance of the given variables on a scale of 1 indicating extremely low effect to 5 extremely high effect. As part of this 5-point Likert-type scale, participants were given the option of 'unsure'. 'Unsure' responses were excluded from the data in order to prevent a skewed result. The ranking of the results was based on the mean of each variable. In addition to the comparison of the ranks of the variables, descriptive statistics were used to further analyse the responses.

- The **mode** was interpreted according to the following:
- 1= Not important
- 2= Little importance
- 3= Important
- 4= Very important
- 5= Extremely important

The **mean** of the responses was analysed according to which range it fell into, based of the following:

- 4.45 – 5 = Extremely important

- 3.60 – 4.45= Very important
- 2.75 – 3.60= Important
- 1.90 – 2.75= Little importance
- 1.00 – 1.900= Not important

The **standard deviation** included in the Tables presented in Chapter 4 was interpreted in line with the following criteria:

- $>0.00 \leq 1.00$ Responses are very closely grouped together.
- $>1.00 \leq 2.00$ Responses are closely grouped together.
- $>2.00 \leq 5.00$ Responses vary and are not closely grouped together.

The skewness of data refers to how the majority of respondents answered a question. In this study, when the skewness was negative, it meant that the respondents generally agreed that the variables were important. However, if the skewness was positive, then the respondents agreed that the variables were not important.

3.7.7 Hypothesis 2 Insufficient Health and Safety Measures

The questions related to Hypothesis 2 sought to determine respondents' perceptions of the effect of insufficient health and safety measures on their academic performance. The section asked them to rank their perceptions on a 5-point Likert-type scale. The data were analysed using descriptive statistics by, mostly, making use of the means of the responses.

The **mode** of the responses was interpreted as follows:

- 1= Strongly disagree
- 2= Disagree
- 3= Neutral
- 4= Agree
- 5= Strongly agree

The **mean** of the responses was analysed according to which range it fell into, based of the following:

- 4.45 – 5 =Strongly agree
- 3.60 – 4.45= Agree
- 2.75 – 3.60= Neutral
- 1.90 – 2.75= Disagree
- 1.00 – 1.900= Strongly disagree

Standard deviation was interpreted in line with the following criteria:

- >0.00 ≤ 1.00 Responses are very closely grouped together.
- >1.00 ≤ 2.00 Responses are closely grouped together.
- >2.00 ≤ 5.00 Responses vary and are not closely grouped together.

For this section, when the skewness was negative, it meant that the respondents generally agreed that the variables were important. However, if the skewness was positive, then the respondents agreed that the variables were not important.

3.7.8   Hypothesis 3 Maintenance of Facilities

The data in this section were used to determine the views of respondents regarding the importance of maintenance facilities. The respondents were asked to rate their level of agreement with statements related to how adequate or inadequate the maintenance of facilities was. The data were analysed using descriptive statistics by, mostly, making use of the means of the responses.

The **mode** of the responses was interpreted as follows:

- 1= Strongly disagree
- 2= Disagree
- 3= Neutral
- 4= Agree
- 5= Strongly agree

The **mean** was analysed according to which range it fell into, based of the following:

- 4.45 – 5 =Strongly agree
- 3.60 – 4.45= Agree

- 2.75 – 3.60= Neutral
- 1.90 – 2.75= Disagree
- 1.00 – 1.900= Strongly disagree

Standard deviation was interpreted in line with the following criteria:

- $>0.00 \leq 1.00$ Responses are very closely grouped together.
- $>1.00 \leq 2.00$ Responses are closely grouped together.
- $>2.00 \leq 5.00$ Responses vary and are not closely grouped together.

For this section, when the skewness of the data was negative, then the respondents generally agreed that the variables were important. However, if the skewness was positive, then the respondents agreed that the variables were not important.

CHAPTER 4

RESULTS, ANALYSES AND INTERPRETATIONS

4.1 INTRODUCTION

This chapter discusses and analyses the research results by noting the testing of each hypothesis. The main aim of the research was to investigate school infrastructure in public secondary schools and to determine the perception of learners regarding the effect of infrastructure development on learners' academic performance. A questionnaire was used for data collection and was physically delivered to three schools. A total of 151 questionnaires were administered, with a 100% response rate.

4.2 DEMOGRAPHIC OF RESPONDENTS

The first section of the questionnaire dealt with the demographic information of the respondents. The data are presented by means of graphs and are then discussed in terms of percentages and frequency of responses. The following demographic data were collected:

- Gender;
- Age;
- Home language of respondents; and
- Number of years at the institution.

4.2.1 Gender

The pupils were asked to indicate their gender, and their responses are shown in Figure 4.1. The majority of the respondents were females (66%, f=99, n=151), while males only formed 34% of the respondents (34%, f=52, n=151).
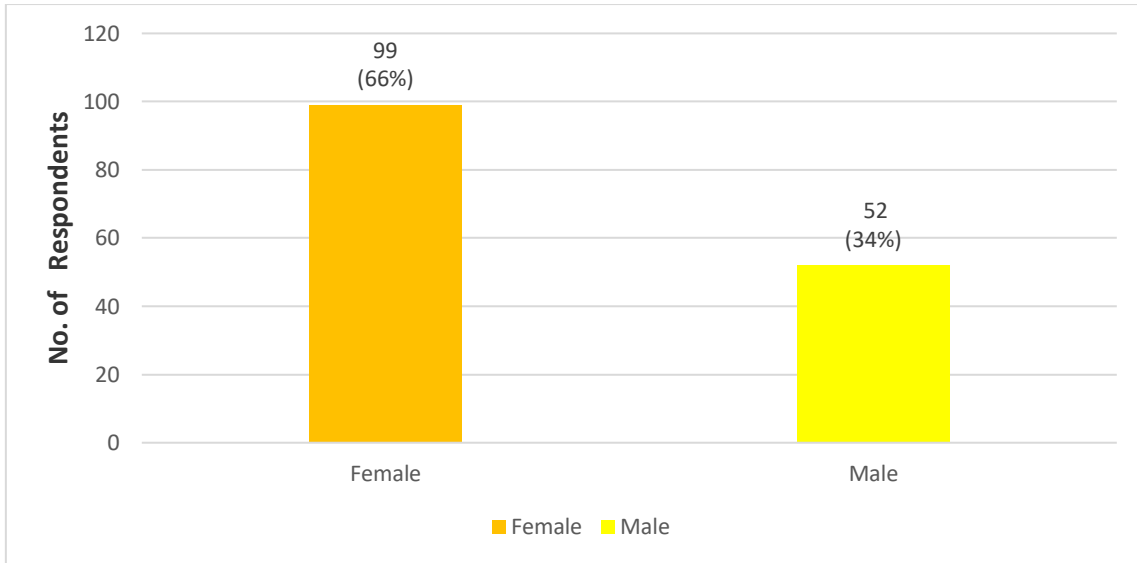
Figure 4.1: Gender of respondents

4.2.2 Age

The various age categories are shown in Figure 4.2. The majority of respondents were aged 16-18 years, with a percentage of 85% (f=129, n=151). Based on this age range, it can be asserted that the respondents in this study can be regarded as mature enough to understand what they need in order to improve their academic performance.
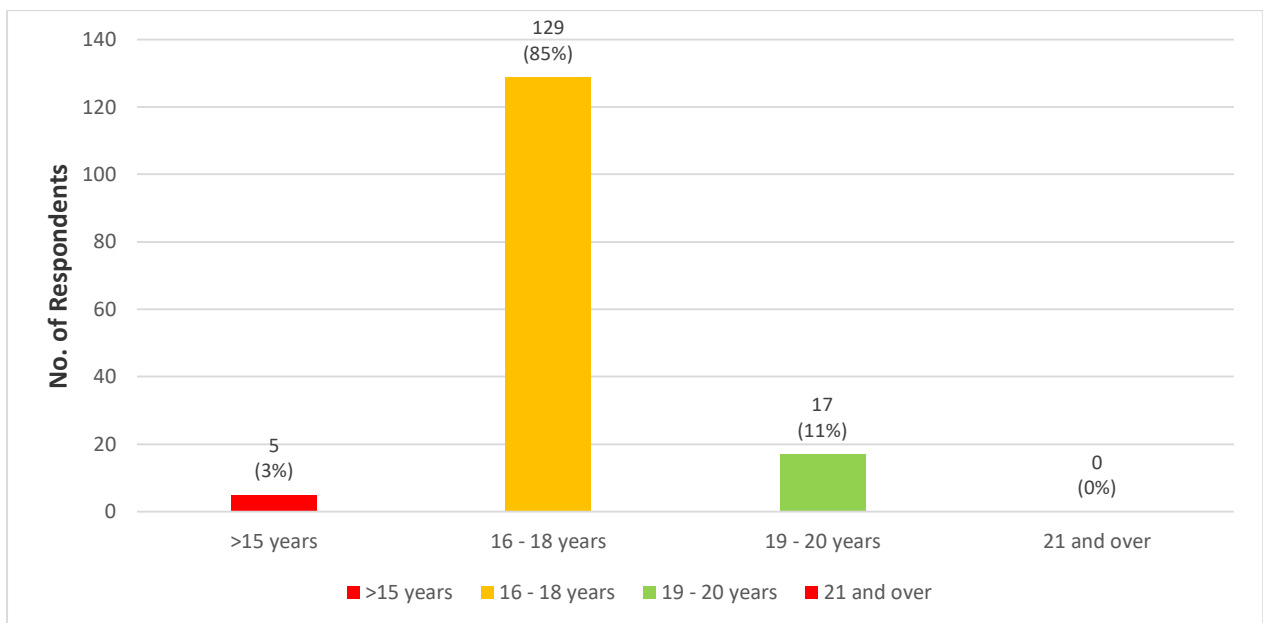
Figure 4.2: Age of respondents

4.2.3 Home Language

The home language of the respondents was not equally represented. All the respondents' home language is Xhosa, as shown in Figure 4.3.
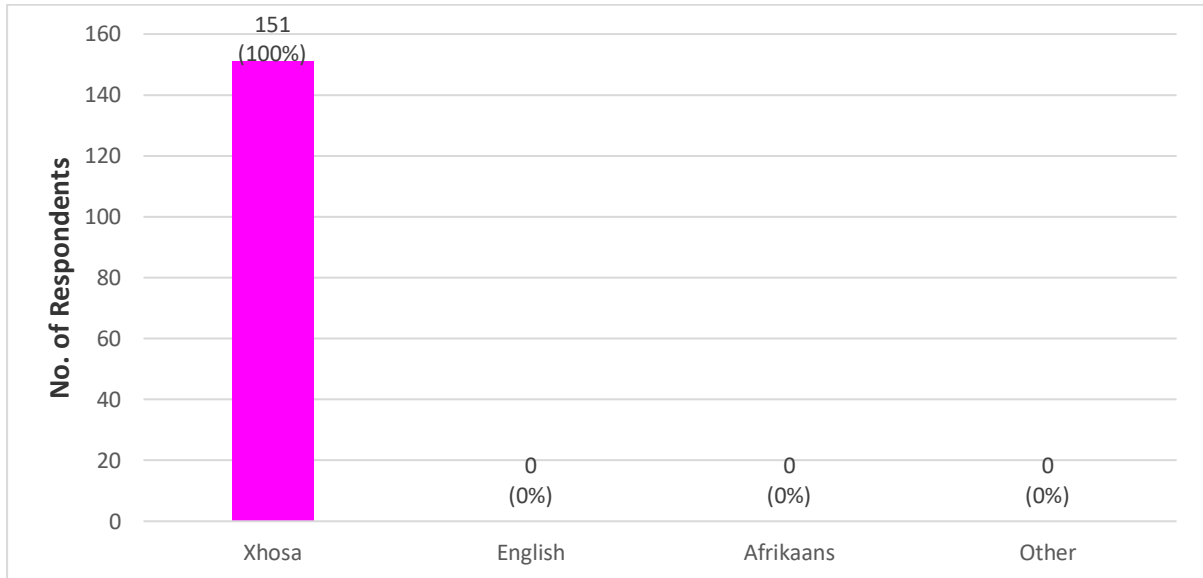
Figure 4.3: Home language of respondents

4.2.4 Number of years at the institution

There were various categories related to the number of years that respondents had attended their respective schools, as shown in Figure 4.4. The majority have spent 2 to 4 years of their schooling at their given institution (80%, f=121, n=151). The longer respondents have attended their schools in question, the more knowledge they could have on the state of infrastructure.
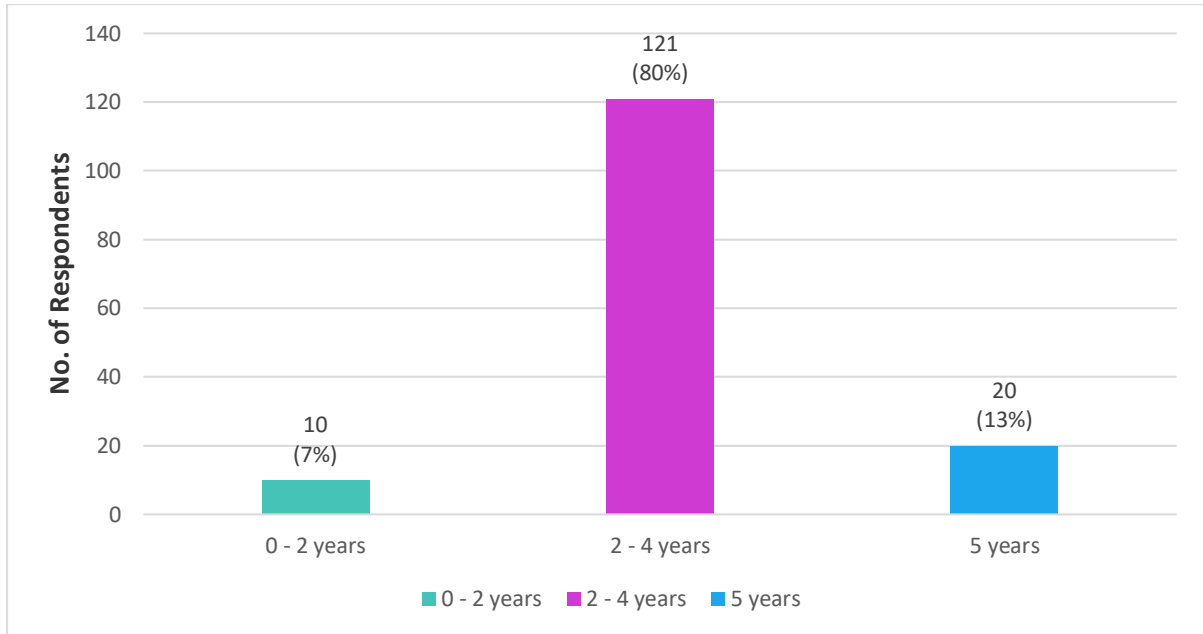
Figure 4.4: Number of years at the institution

4.3   HYPOTHESIS 1 SCHOOL FACILITIES

Hypothesis 1 states that the academic performance of learners is negatively affected by inadequate facilities.

4.3.1   Results

The responses of the effect of infrastructure on learners academic performance are reflected in Table 4.1. The questionnaire asked respondents to rank the effect that school facilities have on their academics. The analysis and determination of the mean scores excludes unsure responses. The responses were offered on a scale of 1 (very low effect) to 5 (extremely high effect). Based on the mean score, the Table 4.1 ranked the variables according to those which were deemed most important in terms of their effect on learners' academic performance.

4.3.2   Analysis of results

Tables 4.1, 4.2, and 4.3 show all the responses as a percentage (n=151). All the tables include descriptive statistics relating to the data's mode, mean, standard deviation, and skewness.

Table 4.1: Effect of infrastructure

In your opinion, to what extent does the following infrastructure affected your academic performance	Extremely low effect….Extremely high effect						Rank	Mode	Mean	Standard deviation	Skewness
	1	2	3	4	5	U					
Playgrounds	(14)9%	(13)9%	(38)25%	(25)17%	(55)36%	(6) 4%	1	5	3.65	1.34	-0.54
Laboratories	(21)14%	(13)9%	(13)9%	(42)28%	(49)32%	(13)9%	2	5	3.62	1.47	-0.68
Library	(5) 3%	(23)15%	(38)25%	(40)27%	(40)27%	(5) 3%	3	5	3.60	1.20	-0.35
Classroom	(6) 4%	(12)8%	(58)38%	(52)34%	(23)15%	(0) 0%	4	3	3.49	1.00	-0.43
Sports fields	(15)10%	(18)12%	(41)27%	(39)26%	(34)23%	(4) 3%	5	4	3.40	1.28	-0.45
Administration office	(16)11%	(29)19%	(44)29%	(34)23%	(10)7%	(18)12%	6	3	2.95	1.16	-0.03

Mode: The modes for Table 4.1 were mostly 5 and 3, which indicated that the respondents considered all the presented variables to have an extremely high or average effect. The results thus lead to the conclusion that all listed variables are important.

Mean: The two top-ranked variables in Table 4.1 prove that both are very important and important, respectively, which means that they both have an average to high effect on academic performance. Playgrounds ranked highest, with a mean score of 3.65. The bottom-ranked variable, with a mean of 2.95, was the administration office. However, even though this variable had the lowest mean score from amongst the presented variables, it still fell within the 'important' category, which indicates that it still has an effect on academic performance.

Standard deviation: The standard deviation of the three top-ranked variables were 1.34, 1.47, and 1.20 respectively. This indicates that the responses were reasonably closely grouped together. Even the remaining variables', except the fourth-ranked variable, responses were extremely closely grouped together (>0.00 ≤ 1.00).

Skewness: The skewness of the variables is negative, with the two top-ranked variables indicating skewness of -0.54 and -0.68, respectively, which indicates respondent agreement in terms of the importance/effect of the variables.

Table 4.2: Current state of school infrastructure

In your opinion, what is the current state of:	Extremely inadequate…Extremely adequate						Rank	Mode	Mean	Standard deviation
	1	2	3	4	5	U				
Administration office	(13)9%	(52)34%	(34)23%	(15)10%	(19)13%	(18) 12%	1	2	2.81	1.12
Classroom	(17)11%	(46)30%	(51)34%	(25)17%	(9) 6%	(3) 2%	2	3	2.75	1.05
Library	(65)43%	(19)13%	(24)16%	(23)15%	(6) 4%	(14)9%	3	1	2.17	1.08
Laboratories	(72)48%	(38)25%	(14)9%	(10) 7%	(5) 3%	(12)8%	4	1	1.83	1.09
Sports fields	(87)58%	(28)19%	(17)11%	(6) 4%	(4) 3%	(9) 6%	5	1	1.68	1.14
Playgrounds	(96)64%	(23)15%	(15)10%	(4) 3%	(6) 4%	(7) 5%	6	1	1.62	1.42

Mode: The mode in Table 4.2 is mostly 1, which indicates that respondents agreed that all the listed variables have an effect (i.e. facilities are extremely inadequate).

Mean: The bottom-ranked variables in Table 4.2 fall within the category extremely inadequate, with means of 1.83, 1.68 and 1.62, respectively. The middle-ranked variables fall into the inadequate category, with mean scores of 2.17. The top-ranked variable has a mean score of 2.81. None of the variables in Table 4.2 were, therefore, considered by participants as less or not important but the current state of the school facilities is mostly inadequate excluding the administration office and classroom which are the top-ranked variables.

Standard deviation: All the variables in Table 4.2 had a standard deviation of between 1.00 and 2.00, which indicates that the responses were all reasonably closely grouped together.

Table 4.3: Infrastructure facilities

	Strongly disagree…Strongly agree						Rank	Mode	Mean	Standard deviation
	1	**2**	**3**	**4**	**5**	**U**				
My classrooms are generally overcrowded.	(17)11%	(34)23%	(21)14%	(17)11%	(62)41%	(7) 5%	1	5	3.65	1.48
The school building is in a good condition; it helps me to perform academically	(26)17%	(38)25%	(51)34%	(19)13%	(14) 9%	(18)12%	2	3	3.02	1.15
I feel motivated and eager to learn when I enter my classroom.	(18)12%	(36)24%	(73)48%	(16)11%	(4) 3%	(12)8%	3	3	2.83	0.91
I was absent from school during this year.	(45)30%	(44)29%	(21)14%	(22)15%	(19)13%	(3) 2%	4	1	2.56	1.41
The physical school building encourages me to attend school every day.	(34)23%	(31)21%	(28)19%	(34)23%	(15)10%	(14)9%	5	2	2.33	1.33
Our school has facilities such as lunch area and sports fields.	(80)53%	(38)25%	(10)7%	(14)9%	(7) 5%	(9) 6%	6	1	1.95	1.19

Mode: The top-ranked variable in Table 4.3 has a mode of 5, which shows that respondents strongly agreed. Middle variables ranked with mode of 3 and 1 , indicating that most respondents neutral and disagreed, while the bottom-ranked variables reported a mode of 1 and 2 falling into the category disagree and strongly disagree.

Mean: The mean score of the top-ranked variables in Table 4.3 was agree with a mean score of 3.65. The rest of the variables were between 1.90 to 2.75, indicating that respondents disagreed.

Standard deviation: The standard deviation of the top-ranked variable in Table 4.3 was 1.48, which indicates that the responses were grouped relatively close together. This finding includes the rest of variables, except for the third-ranked variable, as they all fell into the category of responses that were reasonably closely grouped together (>1.00 ≥ 2.00).

4.3.3   Interpretation and discussion of results

When the respondents were asked to rank variables that affected their academic performance in Table 4.1, the top three variables were indicated as playgrounds, laboratories, and libraries. Playgrounds had an high effect at 36% (f=55, n151), with a mean score of 3.65 and a mode of 5. This can be interpreted as the majority of respondents agreeing that not having playgrounds, including lunch areas, affects their academic performance.

Furthermore, the majority of the respondents agreed that laboratories and libraries have an extremely high effect on their academic performance, with modes of 5 and mean scores of 3.62 and 3.60, respectively, as shown in Table 4.1. The rest of the variable mean scores were still above an average of 2.5, which indicates that the respondents agreed that all listed variables in Table 4.1 had an average to extremely high effect on their academic performance.

The current state of infrastructure Table 4.2

Table 4.2 indicated that the respondents, when asked to rate their current state of school infrastructure, ranked the bottom three variables extremely inadequate; with all three variables reporting modes of 1 and mean scores ranging from 1.00 to 1.90. Thus,

the majority of respondents agreed and/or were neutral about the level to which school facilities are adequate.

Statements from Table 4.3

Table 4.3 offered details of respondents' ranking agreements with regard to various statements related to school infrastructure. The top-ranked statements in Table 4.3 were "classrooms are generally overcrowded", with a mode of 5 (i.e. respondents agreed) and a mean of 3.65. The respondents neutrally agreed that "school building is in a good condition it helps them perform academically", with a mean score of 3.02.The two bottom-ranked variables' modes were 1 and 2. These findings can be interpreted as the majority of respondents disagreeing on having lunch areas and sports fields, with a mean score of 1.95 and respondents also disagreed with a mean score of 2.33 that the physical building encourages them to attend school.

4.3.4 Testing of Hypothesis 1

Hypothesis 1 states that the academic performance of learners is negatively affected by inadequate facilities. The presented analysis clearly supports this first hypothesis by showing that the majority of the study's respondents agreed that inadequate facilities have a negative effect on their academic performance. The learning environment is very important in order to achieve academic performance (McGowen, 2007).

4.4 HYPOTHESIS 2: INSUFFICIENT HEALTH AND SAFETY

The second hypothesis states that the academic performance of learners is negatively affected by insufficient health and safety measures.

4.4.1 Results

Table 4.4 shows all responses as a percentage with n=151. The responses are shown on a scale of 1 (strongly disagree) to 5 (strongly agree). As stated previously, the analysis and determination of the mean score excluded 'unsure' responses. This section of the questionnaire asked respondents to rank insufficient health and safety measures' impact on learners' academic performance. Table 4.4 includes descriptive statistics related to the mean, mode, standard deviation, and skewness.

4.4.2   Analysis of results

Table 4.4: Insufficient health and safety measures

	Strongly disagree…Strongly agree						Rank	Mode	Mean	Standard deviation	Skewness
	1	**2**	**3**	**4**	**5**	**U**					
Sanitation facilities must improve at our school.	(2) 1%	(9) 6%	(7) 5%	(23)15%	(106) 70%	(4) 3%	1	5	4.37	0.99	-1.92
In your opinion to what extent does the state of sanitation facilities affect your academic performance.	(9) 6%	(26)17%	(43)28%	(25) 17%	(37) 25%	(11) 7%	2	3	3.39	1.23	-0.10
Anyone can easily access the school grounds.	(10) 7%	(37)25%	(41)27%	(11) 7%	(47) 31%	(5) 3%	3	5	3.33	1.47	1.34
The school has enough clean drinking water.	(4) 3%	(23)15%	(53)35%	(28) 19%	(19) 13%	(24) 16%	4	3	3.28	1.01	0.02

	Strongly disagree…Strongly agree						Rank	Mode	Mean	Standard deviation	Skewness
	1	**2**	**3**	**4**	**5**	**U**					
The school has a sickroom or medical kit.	(33) 23%	(19)13%	(30)20%	(36) 24%	(32) 21%	(1) 1%	5	4	3.10	1.43	-0.20
I feel safe at school grounds.	(32) 21%	(29)19%	(63)42%	(23) 15%	(2) 1%	(2) 1%	6	3	2.56	1.03	-0.15
My school has security guards.	(72) 48%	(34)23%	(32)21%	(5) 3%	(4) 3%	(4) 3%	7	1	1.88	0.91	1.81
The school provides functioning sanitation facilities.	(77) 51%	(25)17%	(47)31%	(1) 1%	(0) 0%	(1) 1%	8	1	1.81	0.91	0.43
The school teaches fire drills and safety procedures for emergencies.	(118)78%	(33)22%	(0) 0%	(0) 0%	(0) 0%	(0) 0%	9	1	1.68	0.45	2.11

Mode: The mode of the two top-ranked variables is 5 and 3, which indicates that the majority of respondents strongly agreed and neutrally agree to the statement. The bottom-ranked variable has a mode of 1, which can be interpreted as the respondents strongly disagreeing.

Mean: The top-ranked statement in Table 4.4 was based on respondents' perceptions regarding whether or not sanitation facilities should improve at their schools. A mean score of 4.37 indicated that the majority of respondents agreed with the statement. The bottom statements presented with mean scores of 1.68, 1.81, 1.88 and 2.56, which indicates that respondents disagreed and strongly disagreed with those statements. The remaining statements were categorised as neutral (i.e. 2.75 to 3.60).

Standard deviation: The standard deviation of the top- and bottom-ranked statements in Table 4.4 was >0.00 ≤1.00, which indicates that the responses were very closely grouped together. The remaining statements were also closely grouped together (i.e. >1.00 ≤2.00). However, the results do indicate that the responses were moderately varied.

Skewness: The top-ranked statement in Table 4.4 indicated a skewness of -1.92, which highlights that respondents all agreed with the statement. The bottom-ranked statement had a positive skewness of 2.11, which means that respondents strongly disagreed with the statement.

4.4.3 Interpretation and discussion of results

In Table 4.4, findings related to participants' responses regarding their levels of agreement or disagreement with given statements were presented. The responses indicated that 70% (f=106, n=151) of the participants strongly agreed that sanitation facilities must improve at their schools. Furthermore, the skewness of these findings indicated a fairly high negative value, showing that the majority of respondents agreed with the statement that sanitation needed improvement. The middle-ranked statement presented with a mean score of 3.10, indicating a neutral response, with standard deviation of 1.43. These results indicated that responses were closely grouped together, revealing that respondents believe that not having adequate sickrooms negatively affects them. The bottom-ranked statement showed that the majority of respondents strongly disagreed, with a mean score of 1.68. This finding reveals that

participants' schools do not conduct fire drills or teach safety procedures for emergencies.

4.4.4 Testing of Hypothesis 2

Hypothesis 2 states that the academic performance of learners is negatively affected by insufficient health and safety measures.

Table 4.4 showed that the respondents agreed with this hypothesis as most of the statements were confirmed. For example, the top-ranked statement was based on the perception that if schools would improve their sanitation facilities, learners' academic performance would improve; to which the majority of participants agreed. Respondents were neutral in their agreement (i.e. a mode of 3 and a mean score of 3.33) that anyone can easily access the school grounds. The respondents also disagreed with feeling safe within their own school grounds (i.e. a mean score of 2.56). The results for this section suggest that respondents are aware of the importance of health and safety measures at school as well as how these measures affect learners' academic performance. Therefore, the hypothesis is supported.

4.5 HYPOTHESIS 3: MAINTENANCE OF FACILITIES

The third hypothesis states that the academic performance of learners is negatively affected by a lack of facilities maintenance.

4.5.1 Results

Table 4.5 shows participant responses regarding the maintenance of facilities. The responses were presented on a scale of 1 (strongly disagree) to 5 (strongly agree). The analysis and determination of the mean scores, again, excluded 'unsure' responses.

4.5.2 Analysis of results

In Table 4.5, results are presented as percentages, with n=151. The table includes descriptive statistics related to the mean, mode, standard deviation, and skewness of the data.

Table 4.5: Maintenance on facilities

	Strongly disagree…Strongly agree						Rank	Mode	Mean	Standard deviation	Skewness
	1	2	3	4	5	U					
The school is properly designed for its use.	(8) 5%	(20) 13%	(44)29%	(29) 19%	(50) 33%	(0) 0%	1	5	3.62	1.22	-0.38
The school has adequate lighting systems.	(0) 0%	(3) 2%	(70)46%	(56)37%	(20) 13%	(2) 1%	2	3	3.62	0.75	0.35
Most of the classrooms have windows.	(1) 1%	(20) 13%	(74)49%	(40) 26%	(16) 11%	(0) 0%	3	3	3.33	0.86	0.20
The maintenance of the school affects my academic performance.	(7) 5%	(37) 24%	(57)38%	(29) 19%	(8) 5%	(13) 9%	4	3	2.96	1.00	0.15
The school building is in a good condition both internally and externally.	(25) 17%	(31) 21%	(74) 49%	(14) 9%	(3) 2%	(4) 3%	5	3	2.59	0.82	0.01
The classrooms are painted at least every 2 years.	(60) 40%	(39)26%	(17) 11%	(18) 12%	(12) 8%	(5) 3%	6	1	2.20	1.29	0.85
Sanitation facilities are maintained often.	(48) 32%	(58)38%	(38) 25%	(3) 2%	(0) 0%	(4) 3%	7	2	1.97	0.82	0.24
The school is maintained yearly	(80) 53%	(37)25%	(22) 16%	(8) 5%	(0) 0%	(4) 3%	8	1	1.71	0.95	1.15

Mode: The mode of ranked statements in Table 4.5 is based on the respondents' perceptions of the maintenance of facilities at their schools. The top-ranked statement, with a mode of 5, indicated strong agreement. The remainder of the statements were all neutral, with the lowest-rated statements evidencing moderate to strong disagreement (i.e. modes of 1. and 2, respectively).

Mean: In Table 4.5, the top-ranked statement indicated agreement, with a mean score of 3.62. This result proves that the majority of the respondents agreed with the statement. The bottom three statements were categorised as 'disagree' and 'strongly disagree' with a mean score of 1.71, 1.97 and 2.20, while the remainder of the statements' responses were neutral.

Standard deviation: The standard deviation of the first-, fourth-, and sixth-ranked statements were 1.22, 1.00, 1.29, respectively (i.e. a deviation range of $>1.00 \leq 2.00$), which indicates that the responses were grouped relatively close together. The remainder of the statements included in the questionnaire, as presented in Table 4.5, were also very closely grouped together falling in the category of $>0.00 \leq 1.00$.

Skewness: The top statement in Table 4.5 holds a skewness of -0.38, which is very low. However, the finding still highlights that respondents generally agreed with the statement. The remainder of the statements have a positive skewness, which indicates that the respondents disagreed.

4.5.3   Interpretation and discussion of results

The respondents were asked to rank various statements to indicate their levels of agreement or disagreement regarding school maintenance. The results are presented in Table 4.5. The top-ranked statement was the only one where the majority of respondents agreed that their schools were properly designed for their use and the bottom ranked strongly disagreed that school was yearly maintained. The rest of the statements' responses were neutral and disagreed, which indicates that maintenance of facilities at secondary schools is either adequate and inadequate in certain areas according to learner's perception and that it fairly affects respondents' academic performance.

4.5.4 Testing of Hypothesis

The findings that maintenance on facilities at secondary schools are lacking was shown by the bottom ranked statement which indicated 53% of the respondents strongly disagreeing with their schools being yearly maintained, while the remainder of the responses were neutral. Thus, Hypothesis 3 is not false but inconclusive because learners wont really know in depth about maintenance of the school building. They can only answer on their perception. The only people that could give clear conclusion on the school maintenance are the administration, SGB, teachers and principal which were not part of the participants.

4.6 CONCLUSION

According to the findings presented in this chapter, there are four variables that stood out as the most important factors that contribute to a negative learning environment, namely a school's 1) external environment (i.e. playgrounds, lunch areas, and sports fields), 2) internal environment (i.e. classrooms and sanitation facilities), 3) health and safety considerations (i.e. sanitation facilities and access) and 4) physical building design.

The findings showed that the overall view of participants regarding their schools' infrastructure was that it was inadequate. Four main types of infrastructure were identified as extremely inadequate, namely playgrounds (which was the top-rated), laboratories, libraries, and classrooms. Classrooms were identified as being overcrowded and the respondents agreed that overcrowding was not a motivating factor for improved academic performance. Second to classroom concerns was the physical state of schools' infrastructure, where sanitation facilities were identified as being counter-productive to academic performance and posing health hazards. Sanitation concerns were also ranked as the primary challenge in terms of inadequate health and safety. Also under the health and safety, other concerns such as open access to school grounds, were highlighted. In all, the findings indicated that factors related to health and safety require the most attention, as participants further noted that learners were not trained in how to react in cases of emergency.

The physical design of the school buildings was, overall, found to be acceptable, since proper designs have been used. However, maintenance was highlighted as being

inadequate. The two primary factors of concern involved the maintenance of sanitation facilities and annual maintenance, neither of which are currently conducted at the schools.

CHAPTER 5

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1   SUMMARY

Education is deemed to be one of the most important factors for addressing the many challenges that South Africa faces today, including inequality, poverty, poor economic progress, unemployment, and illiteracy (Buck & Deutsch, 2014:1145 and Spaull, 2013:437). It is, therefore, necessary that school environments, together with school infrastructure, be conducive to learning in order to produce favourable outcomes (i.e. quality learning), which, in turn, can produce empowered learners (Le, Janssen & Wubbels, 2018:104)

This study was conducted from the assumption that a conducive learning environment can produce improved academic performance. The aim of this study was to gain the impact of inadequate school infrastructure on learners' academic performance in public secondary schools. The preceding chapter presented the results of the study, while this current chapter offers a discussion related to the findings.

The three hypotheses in this study were grounded on following objectives:

- To determine the perception of learners on the effect of infrastructure on their academic performance.
- To determine the perception of learners on the influence of health and safety measures on their academic performance.
- To determine the perception of learners on the maintenance of infrastructure on their academic performance.

This chapter concludes the research study by noting the study limitations and offering recommendations.

5.2   RESPONDENTS

A quantitative research approach was employed in this study. A 90% confidence level and a margin of error (i.e. confidence interval) of 6% from a population of 750 learners was achieved, as well as a 100% response rate. Thus, the sample was a good representation of the population. Additionally, the breadth and suitability of the sample

contributed to the study's credibility in that most of the learners (85%) were aged between 16 to 18 years and had attended the same school (80%) for 2 to 5 years. These demographics confirmed that the learners had extensive knowledge about the school infrastructure and, thus, the extensiveness and appropriateness of the participants were justified.

5.3   OBJECTIVE 1 – THE EFFECT OF INFRASTRUCTURE

5.3.1   The impact of the external environment

According to the participants, the external environment offers a barrier to their academic performance. The playgrounds, lunch areas, and sports fields were perceived as inadequate. When leisure areas and sports fields are inadequate, they can have a negative impact on learners' ability to perform academically, since these facilities play a supportive and enhancement role in the learning environment (Kimengi *et al.*, 2014:475).

5.3.2   The impact of the internal environment

The internal environment was also perceived as inadequate by participants. The greatest recognisable issue pertained to overcrowded classrooms and sanitation facilities, which were described as being in a poor state. Overcrowded classrooms lead to various challenges, including promoting a negative learning environment, absenteeism, adverse behaviour, and negative attitudes (Muthoni, 2015:17). The literature review revealed that academic performance suffers as a result of overcrowding (Amsterdam, 2010:4, Muthoni, 2015:17 and Parnwell, 2015:15).

Similarly, inadequate sanitation facilities can have a dual negative impact. Firstly, poor sanitation can negatively impact academic performance and, secondly, it can negatively impact the health and safety of learners, with a natural consequence of an overall negative perception of the environment (Equal Education, 2019; Ochien'g, 2013:23 and World Bank, 2017).

5.4   OBJECTIVE 2 – HEALTH AND SAFETY

The sanitation problem noted in the previous section was further exacerbated by the lack of maintenance. Additionally, the safety of learners were found to be compromised as a result of various security failures, including ease of access to school

grounds, a lack of security personnel, and no formal training or drills performed to ensure safety compliance is cases of emergencies. Safety is a vital factor that needs to be addressed, because unsafe conditions can aggravate an already problematic school environment (Jimerson, Hart & Renshaw, 2012:14). The quality of education can be compromised when schools are unsafe, since quality educators refrain from working at schools where safety is problematic (Singh, 2015:6).

5.5 OBJECTIVE 3 – MAINTENANCE OF FACILITIES

5.5.1 Facility Design

Participants agreed that the design of their school buildings was adequate for its purpose. However, appearances can be deceiving, because the environment does not promote learning due to issues of poor maintenance, overcrowding, poor security and sanitation, and so forth, as previously noted. Amsterdam (2010) argues that buildings and infrastructure should create an atmosphere that can result in enhanced learner performance. The atmosphere at the three schools, however, does not promote learning, due to the aforementioned issues.

5.5.2 Maintenance

The study revealed that students observed that maintenance did not occur annually.Poor maintenance can lead to the deterioration of existing infrastructure (Nakao, 2019). Cases of poor maintenance should be seriously addressed, as, in extreme cases of under-maintenance, structures may be weakened and could lead to collapses resulting in injury or death (e.g. the bridge collapse at Hoërskool Driehoek noted in the literature review) (Dlamini, 2019). Superficial improvements are not enough to remedy prolonged cases of neglect or disrepair and continued poor maintenance can lead to learners becoming dispirited (Salary *et al.*, 2018).

It is the responsibility of the decision-makers (e.g. government, principles, SGBs, and other relevant stakeholders) to ensure that schools offer environments that are conducive to learning. Yet, the findings indicate that schools remain in disrepair, which is a serious issue that needs addressing.

5.6   DELIMITATIONS

The findings of this study cannot be viewed as representative of all the schools in the Eastern Cape, since only three schools were targeted for the research due to time and budgetary constraints. Whilst many variables play a role in academic performance, this study only focussed on the impact of infrastructure on learners' academic performance, which means that variables such as the economy of the area were not incorporated. . The study was limited in its ability to actually draw a correlation between its own two variables (i.e. infrastructure and academic performance). A correlation analysis was not done and any corresponding details were drawn from secondary data, which means that further research is needed in this area.

5.7   RECOMMENDATIONS

5.7.1   External Environment

There is a need for decision-makers to employ innovative solutions to the noted challenges. The first step would be to establish the characteristics of the problem at each of the three schools. A proper framework and guidelines should then be implemented and monitored, and this information should then be conveyed to all relevant stakeholders. It may happen that role-players are unable to perform the recommendations of the framework because of lack of understanding, in which case an Indaba (meeting) should be held (Xaba,2012). This meeting should involve all relevant stakeholders (including the community) in order to reveal blockages in the system and seek solutions as a collective.

A shortage of funds should not be an excuse for the lack of maintenance and/or poor school facilities. Innovative solutions could include involving the community to care for schools (e.g. community members could help to enhance and maintain leisure areas and sport fields on a voluntary basis). Gardens could also be established on the school grounds, as food gardens could assist with both beautifying the school environment and supplying students or even the greater community with food.

The ownership of schools also needs to be promoted. For example, parents could assist with maintaining sports fields and helping with coaching. . Learners must also be made aware of their responsibility of lending a hand with cleaning and appreciating existing infrastructure. Identified areas can be beautified for lunch areas that use

recyclable materials to build chairs and tables. When parents contribute their time, they can also hold decision-makers accountable by showing them what they have done and expecting leaders to then also do their part. Another alternative would be for civil society to resort to legal action to force Government officials to address the issues of facilities maintenance at schools (Equal Education, 2019).

5.7.2   Internal Environment

As noted in the literature review, SGBs are responsible for the upkeep of schools. It is, therefore, recommended that SBGs of schools that are struggling to address the challenges of maintenance meet with SBGS from successful schools in order to share ideas, collaborate, or seek solutions. SBGs could also interact with their local community to gain solutions. Alternatively, SBGs should learn new ways for holding the government accountable (Mohapi & Netshitangani, 2018:8).

In terms of addressing overcrowded classes, time management may be the answer. For example, schools could offer staggered time – lengthening class times by breaking lessons into two parts, with both morning and afternoon classes. Two sets of educators would then be necessary, with one set for the morning classes, and one set for the afternoon classes.

5.7.3   Health and Safety

The findings from this study indicated that health and safety are a particularly serious concern, which requires accelerated and concerted effort from government, SGBs,principal, teachers and community. Preventative maintenance could reduce costs, save lives, and prevent further deterioration of extant infrastructure (Kimengi *et al.*, 2014:476). Fire drills and training for emergency situations also need to be initiated in order for learners and all other relevant stakeholders to be prepared for such situations.

SGBs could also invite parents, teachers, learners and community members to perform certain duties at the schools instead of only requiring them to offer or raise funds for the schools, as some parents cannot afford to contribute financially, but may be willing to offer their time. For example, parents or community members could assist with access control and maintenance jobs. Community could do community drives to limit external community members from vandalizing or stealing school property by

having patrols or having better ties with local police. Also involving NGOs and getting sponsors from private sector to assist with sanitation facilities and security upgrades.

5.7.4   Physical building design

In order to prevent the deterioration of buildings and infrastructure, proper planning of new schools must be conducted with the assistance of relevant experts. That is, new school building designs should be created with the intention to create high academic performance schools that produce a healthy school environment (Environmental Protection Agency, 2018).The existing schools can upgrade current buildings to have a better ventilation system, light, sanitation facilities, repainting classes and creating landscape These schools should then put a maintenance policy in place, and infrastructure must be effectively managed.

5.8   CONCLUSION

The study highlighted that education is key to solving many of the challenges faced in South Africa today. However, in poverty-stricken areas, learners are often disadvantaged and may, ultimately, become a further burden on, as opposed to solutions to, the already-challenged country. This means that many children's right to education is violated, particularly with regard to how school buildings are often not conducive to learning as a result of inadequate infrastructure and a lack of maintenance.

The government introduced SGBs as a community component within the education system in 1996 through the South African Schools Act 84; however, the system has been compromised due to various barriers, which have resulted in poor academic performance. Parents, therefore, need to play a bigger role in their children's education. Parents depend on SGBs to manage schools; however, it is evident that some SGBs do not deliver on maintenance and parents and external community should assist. SGBs, in turn, should actively implement maintenance changes, monitoring, and upliftment.

5.9 FURTHER RESEARCH

A need exists for a comprehensive study that focus specifically on correlating the variables of infrastructure against academic performance on a larger scale to gain a better understanding of the impact it has on South African schools.

It appears that decision-makers need to get serious regarding infrastructure management and maintenance. There may be various reasons for the poor state of the infrastructure, and future studies could assist in revealing the nature and sources of this slow response.. A further study could be considered to investigate the value of well-maintained schools as decision makers many not be aware of the positive impact on the learning environment.

A need also exists to study successful institutions (in terms of infrastructure resources). These schools may exist in poverty-stricken areas and they may have knowledge of methods that work. In other words, information must be uncovered for the efficient and cost-effective school maintenance management practices and needs to be tested

Innovation is required to address the many of the challenges concerning schools in poverty-stricken areas. However, it may be that SGBs are not able to access or apply the necessary skills and innovation to bring about change. Thus, a study related to SGB governance and required skills could be beneficial for establishing how to involve people who have the necessary skills and expertise in addressing issues of school infrastructure and maintenance.

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APPENDIX A: GENERAL SECTION

This section asked the respondents to add any further comments and features/facilities they would like to be included in the current infrastructure in order to improve their academic performance.

- "I would like have computer labs, Wi-Fi, sport fields, playgrounds and eating area".

- "I think that the school should have sport fields and computer labs".

- "We need proper sanitation facilities, computer labs and sport fields".

- "Facilities that would improve our academic performance is having practical rooms (consumer studies), science labs, sport fields, good library and well-equipped classes".

- "We in need of sports fields, sanitations facilities ".

- "Build toilets and sports ground".

- "They should build playgrounds and also have computer labs".

- "Laboratories for both physics and life science should be built for practical's, it is difficult to understand some of our work without doing experiments so if these can b built it will improve our academic performance and school facilities".

- "Good sport facilities, computers and projectors".

- "Sport fields, adequate library's with computers for assignments, WI-FI and toilets that are enough and working".

- "WI-FI network, computer labs, Lunch facilities, sport fields and music classes".

- "Computer rooms, sport fields, laboratories and improve sanitation facilities".

- "Sport equipment, computer labs, laboratories and new sanitation facilities".

- "Need adequate classes for consumer studies and computer labs with Wi-Fi to do our projects".

- "Computer labs, toilets, cooking equipment, laboratories and sports grounds".

- "We need Computer labs and sanitation facilities because it's a huge problem as school".

- "Computer labs with WI-FI so we able do to our assignments and be able to apply to varsities, we also need lunch areas for break time"

- "We should have sport grounds, lunch areas and clean sanitation facilities so we don't get infections".

- "I would include computer labs for assignment research, design classrooms for consumer studies, eating areas so teachers can stop complaining making classrooms dirty since we spend our break times in the classrooms. We also need sports fields so we can play sports and have better opportunities when applying for university".

- "Computer labs, a school library with informative books. We need more kitchens for learners who do consumer studies and sport fields to motivate us to be more active, which will also teach us leadership skills and teamwork".

- "I think having adequate sports fields would really have a good impact on the learners. Also having computer labs to do our assignments at school would really be helpful and improve our academic performance".

- "Our academic performance would improve if the school provides computer labs, sports fields, skill development programs and afternoon classes".

- "Computer labs and WI-FI, sports fields, well-equipped library, build music room, lunch areas and laboratories".

- "Extending the library to have more space, computers would assist with our research for assignments, need well equipped labs and build sports grounds for learners that are interested in playing sports and are gifted in that area".

- "The state of the soccer fields and netball courts need to be improved. The library should be in a good state so we could easily access and use it. We need playgrounds for break time to relax our minds instead of spending our lunch time in classes".

- "We need to be built well equipped classrooms because we are currently using small prefabs for classes, school library and be able to receive texts

books for every subject, laboratories for practical's and adequate sanitation facilities".

- "To improve academically we need to have a library at our school, computer labs and sports fields. We need to be built more classrooms so that we are not overcrowded because our biggest class is 70 learners".

- "I want the school toilets to be regularly maintained to reduce unhealthy conditions. The school also need to improve the overcrowding of classrooms by building more classrooms, having a safe and clean environment can motivate me to do well academically".

- "If we have a library we can improve academically, and we also need playgrounds to relax and freshen up".

- "We need adequate sanitation facilities and more classrooms to decrease the overcrowding".

- "I would be happy at school if it was well maintained and the old broken-down facilities were replaced"

- "Our classrooms should have more space to move around and air-conditioners for when it is cold and hot. We also need more white boards for teachers to write notes and we need playgrounds, lunch areas and most importantly libraries and computer labs".

- "Our school is in need of a library and it needs to build well equipped classes and they must be maintained yearly. We a first aid kit and sick room".

- "We need laboratories for Life Science and Agriculture. We need to build more classrooms so that its teacher t learner ratio"

- "The school needs a library and computer labs to motivate us leaners to attend school. We also need well equipped classrooms and fully furnished and clean toilets".

- "My academic performance would improve if we had a school library so that we as leaners would be able to go and gather information of our schoolwork".

- "We need computer labs and libraries to do our assignments in a safe environment rather than going to unsafe community facilities also we need lunch areas and sport fields "

- "We can improve academically and be motivate if we are built school library so we could do our assignment research".

- "We need a school library so that we can perform well at school and we also need laboratories, classroom visual displays like chemistry charts to be motivate when entering the classroom".

- "We need to be built more classrooms because we are overcrowded in class and the need to be fully furniture with chairs and desks because the current ones are broken and uncomfortable. Maintenance for sanitation facilities".

- "We need clean toilets; we need our classes to be built with windows to protect us from bad weather because some of our current classes have broken windows when it's cold, I am not motivated to come to school. We need a school library so we able to do research for the assignments that we receive".

- "Library can actually improve my academic performance in terms of helping me with my studies and my assignments. We should have medical aid kit/sickroom to avoid having to missing school when we sick".

- "This school needs to upgrade their laboratories and build a school library because most books are stored in the storeroom, we don't have access to books for our assignments and we end up having to find community library's which are far away from most of us. We also need new sports fields, sanitation facilities and maintenance of facilities so we can relax and not have to clean our classes".

- "To improve my academic performance, I need access to a school library and laboratories to assist me on completing my assignments. We need security guards for our safety".

- "We need a fully equipped classrooms with visual displays to motivate us to understand certain subjects, the new classes will really help with the

overcrowding and having less learners in class will help us to concentrate more and our teacher will not waste time shouting us".

- "We need a library so that we can learn how to read and do research for our assignments. Learners are talented at this school, but we don't have sports fields, so it be great if we would get sports facilities and most importantly clean toilets, so we don't get diseases".

- "Our school needs a library, we need good adequate lighting in our classrooms, need new classrooms because our biggest grade 11 class is 70 learners in one classroom. We'd also love lunch areas for break time and stop spending our breaks in the classroom. Get sports fields for learners who want to play sports".

- "I would be happy if our school gets infrastructure development, improve maintenance facilities and safety measures".

- "Our books are kept in a storeroom we need a library so we can have access to book when given an assignment, we should also have sports fields and playgrounds to be more motivated".

- "We must have laboratories in order to pass our practical's, library in order to finish our assignments in time. We must have clean and healthy toilets so that we don't get infections. We need playgrounds/lunch areas so that we can keep our classes clean".

- "My academics would improve if we had more classrooms, a music class, a school library and playgrounds".

- "I would love if our new school could have a school library, laboratories, auditorium/music room, playgrounds and security guards".

- "I would like to have a library and computer labs for assignments and be ale to research information for which varsity I can apply to, these would improve my academic performance"

- "I wish there can be sports fields because there are students that are actually good at sports but don't get the opportunity".

- "Would love if could get access to a computer lab and use the internet for our schoolwork"

- "We would love to have sports facilities because we have a shortage of sports equipment so that makes learners demotivated to play sports and playing sports would decrease the time spent in the township doing nothing".

- "We need extra classes and extra equipment for our labs, the library needs more textbooks that we could use for our assignments and our sanitation facilities to be adequate and maintained because we currently don't have working toilets".

- "It would be great if we would get working toilets and fix the general school environment that we learn in and add extra laboratories to be able to do our practical's, this would definitely encourage me and improve my academic performance".

- "Science labs are used as general classrooms so we need better laboratories, free Wi-Fi could really help us with research for our projects. We also need better sports fields".

- "Computer labs are needed for assignments and research our library needs to be renovated and needs more informative books because the ones we have already are not even on the Caps syllabus".

- "I would like the school to provide us with a general computer lab because the one we have is used by CAT students only. The school should have sports facilities and school library".

- "The school must have lunch areas; we need computer labs and internet access for our assignments and better sanitation facilities and build classes that are fully furniture.

- "The school must have clean functioning toilets because we get infection, or we don't feel like coming to school when we it's our menstrual cycle".

- "Sanitation could be prioritised, we need computer labs because the current lab is not enough for students".

- "I would like the school to have free Wi-Fi access and laboratories to do our experiments".

- "We would like to have library so that we can be able to do our school work because we always struggling at home doing our assignments at work with

our phones some of us don't have money to buy data to finish our assignments and the library would come in handy".

- "Things that could improve my academic performance is getting access to proper sports fields because I truly love sports and am good at it and this would motivate me to improve in other subjects since sports teachers me patience to perfect certain skills".

- These a lot that could improve our academic performance but most importantly we need facilities such as school library, computer labs, laboratories, sports fields and social centers whereby learners can go and talk to counselors about their problems because as individuals(learners) come across many problems that we don't know how to deal with them".

- "To improve my academic performance the school should have more computer labs to do our assignments".

APPENDIX B: LETTER FROM THE LANGUAGE PRACTITIONER

One Stop Solution
24 Firenze Gardens
Warbler Road
Cotswold Ext
Port Elizabeth
6045
www.onestopsolution.co.za

TO WHOM IT MAY CONCERN

I, Debby Dewes, declare that I have proofread and edited the language (spelling, grammar, punctuation, consistency) of the thesis by:

Nomava Goduka (213221268)

entitled:

THE PERCEPTIONS OF LEARNERS ON THE EFFECT OF INFRASTRUCTURE DEVELOPMENT ON LEARNERS' ACADEMIC PERFORMANCE IN PUBLIC SECONDARY SCHOOLS

Submitted in partial fulfilment of the requirements for the degree of Master of Science in Built Environment (Property Economics and Valuation) in the Faculty of Engineering, The Built Environment and Information Technology at the Nelson Mandela University.

I cannot guarantee that the changes that I have suggested have been implemented nor do I take responsibility for any other changes or additions that may have been made subsequently.

Any other queries related to the language editing of this treatise may be directed to me at 076 481 8341.

Dated at Port Elizabeth on 17 December 2019

D.K. Dewes

APPENDIX C: APPROVAL LETTER DOE

Province of the
EASTERN CAPE
EDUCATION

STRATEGIC PLANNING POLICY RESEARCH AND SECRETARIAT SERVICES
Steve Vukile Tshwete Complex · Zone 6 · Zwelitsha · Eastern Cape
Private Bag X0032 · Bhisho · 5605 · REPUBLIC OF SOUTH AFRICA
Tel: +27 (0)40 608 4691/4773 · Fax: +27 (0)86 742 4942 · Website: www.ecdoe.gov.za

Enquiries: B Pamla   Email: babalwa.pamla@ecdoe.gov.za   Date: 01 November 2019

Ms Nomava Goduka

10 Bluewater Drive

Bluewater Bay

Port Elizabeth

6210

Dear Ms. N Goduka

PERMISSION TO UNDERTAKE MASTERS STUDY: "THE PERCEPTIONS OF LEARNERS ON THE EFFECT OF INFRASTRUCTURE DEVELOPMENT ON PERFOMANCE IN PUBLIC SECONDARY SCHOOLS" APPLICATION TO CONDUCT RESEARCH

1. Your application to conduct the above mentioned research involving 150 learners and 3 schools in the jurisdiction of Nelson Mandela Bay District in the Eastern Cape Department of Education (ECDoE) is hereby approved based on the following conditions:

   a. there will be no financial implications for the Department;

   b. you will make all necessary arrangement concerning your research;

   c. institutions and respondents must not be identifiable in any way from the results of the investigation;

   d. all ethical considerations are adhered to;

   e. you seek parents' consent for minors;

   f. it is not going to interrupt educators' time and task;

   g. the research may not be conducted during official contact time, including school breaks, but an arrangement to do research at the school after school hours may be arranged and agreed upon in writing with the Principal and the affected teacher/s;

   h. you present a copy of the written approval letter of the Eastern Cape Department of Education (ECDoE) to the Cluster and District Directors before any research is undertaken at any institutions within that particular district;

building blocks for growth

Page 1 of 2

Ikamva eliqaqambileyo!

   i.   should you wish to extend the period of research after approval has been granted, an application to do this must be directed to Chief Director: Strategic Management Monitoring and Evaluation;

   j.   your research will be limited to those institutions for which approval has been granted, should changes be effected written permission must be obtained from the Chief Director: Strategic Management Monitoring and Evaluation;

   k.   you present the Department with a copy of your final paper/report/dissertation/thesis free of charge in hard copy and electronic format. This must be accompanied by a separate synopsis (maximum 2 – 3 typed pages) of the most important findings and recommendations if it does not already contain a synopsis.

   l.   you present the findings to the Research Committee and/or Senior Management of the Department when and/or where necessary.

   m. you are requested to provide the above to the Chief Director: Strategic Management Monitoring and Evaluation upon completion of your research.

   n.   you comply with all the requirements as completed in the Terms and Conditions to conduct Research in the ECDoE document duly completed by you.

   o.   you comply with your ethical undertaking (commitment form)

   p.   You submit on a six monthly basis, from the date of permission of the research, concise reports to the Chief Director: Strategic Management Monitoring and Evaluation

2. The Department reserves a right to withdraw the permission should there not be compliance to the approval letter and contract signed in the Terms and Conditions to conduct Research in the ECDoE.

3. The Department will publish the completed Research on its website.

4. The Department wishes you well in your undertaking. You can contact the Director, Ms. NY Kanjana on the numbers indicated in the letterhead or email nelisa.kanjana@ecdoe.gov.za should you need any assistance.

NY KANJANA
DIRECTOR: STRATEGIC PLANNING POLICY AND RESEARCH

FOR SUPERINTENDENT-GENERAL: EDUCATION

building blocks for growth.   Page 2 of 2   *Ikamva eliqaqambileyo!*

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APPENDIX D: ETHICS APPROVAL LETTER

NELS●N M▲NDELA

UNIVERSITY

PO Box 77000, Nelson Mandela University, Port Elizabeth, 6031, South Africa mandela.ac.za

Chairperson: Research Ethics Committee (Human)
Tel: +27 (0)41 504 2235
charmain.cilliers@mandela.ac.za

NHREC registration nr: REC-042508-025

Ref: [H19-ENG-CMA-001] / Approval]

9 October 2019

Mr R Cumberlege
Faculty: EBEIT

Dear Mr Cumberlege

THE PERCEPTIONS OF LEARNERS ON THE EFFECT OF INFRASTRUCTURE DEVELOPMENT ON ACADEMIC PERFORMANCE IN PUBLIC SECONDARY SCHOOLS

PRP: Mr R Cumberlege
PI: Ms N Goduka

The above-entitled application served at the Research Ethics Committee (Human) (*meeting of 28 August 2019*) for approval. The study is classified as a medium risk study. The ethics clearance reference number remains H19-ENG-CMA-001 and approval is subject to the following conditions:

1. The immediate completion and return of the attached acknowledgement to Imtiaz.Khan@mandela.ac.za, the date of receipt of such returned acknowledgement determining the final date of approval for the study where after data collection may commence.
2. Approval for data collection is for 1 calendar year from date of receipt of above mentioned acknowledgement.
3. The submission of an annual progress report by the PRP on the data collection activities of the study (form RECH-004 to be made available shortly on Research Ethics Committee (Human) portal) by 15 November this year for studies approved/extended in the period October of the previous year up to and including September of this year, or 15 November next year for studies approved/extended after September this year.
4. In the event of a requirement to extend the period of data collection (i.e. for a period in excess of 1 calendar year from date of approval), completion of an extension request is required (form RECH-005 to be made available shortly on Research Ethics Committee (Human) portal)
5. In the event of any changes made to the study (excluding extension of the study), completion of an amendments form is required (form RECH-006 to be made available shortly on Research Ethics Committee (Human) portal).
6. Immediate submission (and possible discontinuation of the study in the case of serious events) of the relevant report to RECH (form RECH-007 to be made available shortly on Research Ethics Committee (Human) portal) in the event of any unanticipated problems, serious incidents or adverse events observed during the course of the study.
7. Immediate submission of a Study Termination Report to RECH (form RECH-008 to be made available shortly on Research Ethics Committee (Human) portal) upon unexpected closure/termination of study.
8. Immediate submission of a Study Exception Report of RECH (form RECH-009 to be made available shortly on Research Ethics Committee (Human) portal) in the event of any study deviations, violations and/or exceptions.
9. Acknowledgement that the study could be subjected to passive and/or active monitoring without prior notice at the discretion of the Research Ethics Committee (Human).

2

Please quote the ethics clearance reference number in all correspondence and enquiries related to the study. For speedy processing of email queries (to be directed to Imtiaz.Khan@mandela.ac.za), it is recommended that the ethics clearance reference number together with an indication of the query appear in the subject line of the email.

We wish you well with the study.

Yours sincerely

CBcillies

Prof C Cilliers
Chairperson: Research Ethics Committee (Human)

Cc: Department of Research Capacity Development
        Faculty Officer: EBEIT

Appendix 1: Acknowledgement of conditions for ethical approval

APPENDIX E: PRINCIPAL APPROVAL LETTER

• PO Box 77000 • Nelson Mandela University
• Port Elizabeth • 6031 • South Africa • www.mandela.ac.za

NELS●N M▲NDELA
UNIVERSITY

The perceptions of learners on the effect of infrastructure development on academic performance in public secondary schools

School Principal Consent Form

I give consent for you to approach learners from grade 11 to participate in the
The perceptions of learners on the effect of infrastructure development on academic performance in public secondary schools

I have read the Project Information Statement explaining the purpose of the research project and understand that:

- The role of the school is voluntary
- I may decide to withdraw the school's participation at any time without penalty
- Learners in grade 11 will be invited to participate and that permission will be sought from them and also from their parents.
- Only learners who consent and whose parents consent will participate in the project
- All information obtained will be treated in strictest confidence.
- Learners will not be identifiable in any written reports about the study.
- The school will not be identifiable in any written reports about the study.
- Participants may withdraw from the study at any time without penalty.
- A report of the findings will be made available to the school.
- I may seek further information on the project from Nomava Goduka on 041 4668866.

MAARMAN ML
_____
Principal

14 / 10 / 2019
_____
Date

Please return to: s213221268@mandela.ac.za

NELS●N M▲NDELA

UNIVERSITY

• PO Box 77000 • Nelson Mandela University
• Port Elizabeth • 6031 • South Africa • www.mandela.ac.za

The perceptions of learners on the effect of infrastructure development on academic performance in public secondary schools

School Principal Consent Form

I give consent for you to approach learners from grade 11 to participate in the

The perceptions of learners on the effect of infrastructure development on academic performance in public secondary schools

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- Learners in grade 11 will be invited to participate and that permission will be sought from them and also from their parents.
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- All information obtained will be treated in strictest confidence.
- Learners will not be identifiable in any written reports about the study.
- The school will not be identifiable in any written reports about the study.
- Participants may withdraw from the study at any time without penalty.
- A report of the findings will be made available to the school.
- I may seek further information on the project from Nomava Goduka on 041 4668866.

MAARMAN ML
_____
Principal

14 | 10 | 2019
_____
Date

Please return to: s213221268@mandela.ac.za

NELS●N M▲NDELA
UNIVERSITY

• PO Box 77000 • Nelson Mandela University
• Port Elizabeth • 6031 • South Africa • www.mandela.ac.za

The perceptions of learners on the effect of infrastructure development on academic performance in public secondary schools

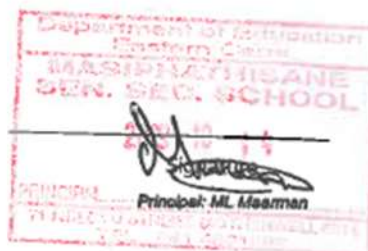### School Principal Consent Form

I give consent for you to approach learners from grade 11 to participate in the

The perceptions of learners on the effect of infrastructure development on academic performance in public secondary schools

.

I have read the Project Information Statement explaining the purpose of the research project and understand that:

- The role of the school is voluntary
- I may decide to withdraw the school's participation at any time without penalty
- Learners in grade 11 will be invited to participate and that permission will be sought from them and also from their parents.
- Only learners who consent and whose parents consent will participate in the project
- All information obtained will be treated in strictest confidence.
- Learners will not be identifiable in any written reports about the study.
- The school will not be identifiable in any written reports about the study.
- Participants may withdraw from the study at any time without penalty.
- A report of the findings will be made available to the school.
- I may seek further information on the project from Nomava Goduka on 041 4668866.

F.N Bottoman
_____
Principal

19/11/19
_____
Date

_____
Signature

Please return to: s213221268@mandela.ac.za

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APPENDIX F: SGB's APPROVAL LETTER

NELS•N M∆NDELA
UNIVERSITY

• PO Box 77000 • Nelson Mandela University
• Port Elizabeth • 6031 • South Africa • www.mandela.ac.za

The perceptions of learners on the effect of infrastructure development on academic performance in public secondary schools
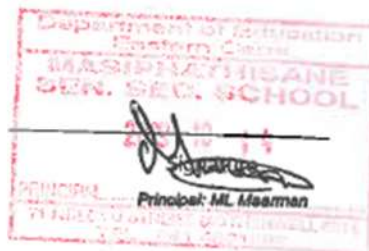
School Principal Consent Form

I give consent for you to approach learners from grade 11 to participate in the
The perceptions of learners on the effect of infrastructure development on academic performance in public secondary schools

I have read the Project Information Statement explaining the purpose of the research project and understand that:

- The role of the school is voluntary
- I may decide to withdraw the school's participation at any time without penalty
- Learners in grade 11 will be invited to participate and that permission will be sought from them and also from their parents.
- Only learners who consent and whose parents consent will participate in the project
- All information obtained will be treated in strictest confidence.
- Learners will not be identifiable in any written reports about the study.
- The school will not be identifiable in any written reports about the study.
- Participants may withdraw from the study at any time without penalty.
- A report of the findings will be made available to the school.
- I may seek further information on the project from Nomava Goduka on 041 4668866.

P.C MANGU
Principal

16 / 10 / 2019
Date

Signature

Please return to: s213221258@mandela.ac.za

MFESANE
SENIOR SECONDARY SCHOOL
P.O. BOX 92, MOTHERWELL
1 6 OCT 2019
PORT ELIZABETH, 6211.
Principal: P.C. MANELI

111

NELS N M NDELA

UNIVERSITY

• PO Box 77000 • Nelson Mandela University
• Port Elizabeth • 6031 • South Africa • www.mandela.ac.za

The perceptions of learners on the effect of infrastructure development on academic performance in public secondary schools
School Govern Body Consent Form

I give consent for you to approach learners from grade 11 to participate in the

The perceptions of learners on the effect of infrastructure development on academic performance in public secondary schools.

I have read the Project Information Statement explaining the purpose of the research project and understand that:

- The role of the school is voluntary
- I may decide to withdraw the school's participation at any time without penalty
- Learners in grade 11 will be invited to participate and that permission will be sought from them and also from their parents.
- Only learners who consent and whose parents consent will participate in the project
- All information obtained will be treated in strictest confidence.
- Learners will not be identifiable in any written reports about the study.
- The school will not be identifiable in any written reports about the study.
- Participants may withdraw from the study at any time without penalty.
- A report of the findings will be made available to the school.
- I may seek further information on the project from Nomava Goduka on 041 4668866.

_____   S. JODWANA
Chairperson SGB   Signature

19 / 11 / 2019
Date

Please return to: s213221268@mandela.ac.za

APPENDIX G: COVER LETTER

NELS◉N M▲NDELA
UNIVERSITY

North Campus
Nelson Mandela University
Tel: +27 (0)41 4668866
E-mail: s213221268@mandela.ac.za

Date:
Ref: (Reference Number supplied upon granting of ethics approval)
Contact person: Nomava Goduka

Dear Grade11 learners,

You are invited to participate in a research study tilted: "The perceptions of learners on the effect of infrastructure development on academic performance in public secondary schools". The study will be conducted by Nomava Goduka, a MSc Property Economics and Valuation student at the Nelson Mandela University. The aim of the study is to assess the influence of school infrastructure on learners' academic performance in public secondary schools. Your participation in the survey will assist educators to better understand the influence of inadequate infrastructure on academic performance. Your parents will be given an assent form to sign for learners under the age of 18 years but your parents won't be participating in the study.

You have the right to privacy and confidentiality, therefore your names will not appear on the questionnaire. Your anonymity will be protected. This study has been reviewed and approved by the Nelson Mandela University Research Ethics committee, ethic ref no. ….

Your participation in this study is completely voluntary. You may decline to answer any questions and you have the right to withdraw from the study at any time without any consequences. Once you have completed the survey your names will be automatically placed in the lucky draw for a cash prize or hamper. The survey should take no longer than 30 minutes. If you have any queries, please feel free to contact the researcher listed above.

Yours Sincerely

Nomava Goduka
RESEARCHER

APPENDIX H: PARENTS ASSENT FORM

NOMAVA GODUKA
108 BLUEWATER DRIVE | 041 466 8866 | s213221268@MANDELA.AC.ZA

NELSON MANDELA
UNIVERSITY

The perceptions of learners on the effect of infrastructure development on academic performance in public secondary school
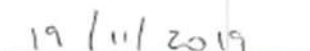
Insert date here

Dear Parents,

I would like to invite your children to take part in a research study. This research study will be conducted by myself Nomava Goduka, a MSc in Property Economics and Valuation student at the Nelson Mandela University. The purpose of the study is to investigate the influence of school buildings on academic performance of public secondary schools. The learner's participation will be helpful to better understand their perspective of the influence of school buildings on their academic performance. They will be given a questionnaire to fill in. I will explain the questionnaire beforehand so they understand the survey clearly. The researcher will be there every step of the way when filling in the questionnaire to clarify any questions.

This study will help the Department of Education to become more aware of the need of new school facilities. Also increasing school budgets to build new schools. Teachers will also have a better understanding of the influence of inadequate school buildings on academic performance. Hopeful the school govern body will become more aware of the need to maintain the facilities regularly not only when they break down.

The learners have the right to privacy and confidentiality, therefore their names will not appear on the questionnaire. Their participation in this study is completely voluntary. They may decline to answer any questions and they have the right to withdraw from the study at any time without any consequences. Once they have completed the survey their names will be automatically placed in the lucky draw for a cash prize or hamper. Should the child not finish filling in the questionnaire they won't be selected for lucky draw. The survey should take no longer than 30 minutes. If you have any queries, please feel free to contact the researcher listed above.

Yours Sincerely,

Nomava Goduka
Researcher

Do you understand this study and are you willing to let your child participate?

| YES | NO | YES | NO |

_____   _____
Signature of parent   Date

NOMAVA GODUKA

108 BLUEWATER DRIVE|041 466 8866 | s213221268@MANDELA.AC.ZA

NELS●N M▲NDELA
UNIVERSITY

Ifuthe lesakhiwo sesikolo ekhuphuculeni izinga leziphumo zabatwana kwizikolo zemfundo ephakamileyo

Insert date here

Bazali ababekileyo,

Ndiyanicel ukuba abantwana besikolo bayinxenye yolu phando(research) olu phando luyakuba lusenziwa ndim mna Nomava Goduka kwisifundo sesidanga semfundo ephakamileyo (MSc Property Economics & Valuation) kwiDyunivesithi yase Nelson Mandela.Injongo yolu phando kukujonga ifuthe lesakhiwo sesikolo kwiziphumo zabafundi. Uthatho lwezakhiwo zesikolo kwizifundo.Baya kunikwa imibuzo ebhaliweyo ukuba bayiphendule emalunga nolu phando.Ndiza kuba cacisela kuqala mibuzo ukuze babe nomqondo bale not ifunwayo.Ndiya kusoloko ndikhona ngalo lonke ixesha bephendula ukuze ndicacise xa benokuba nombuzo abangawuqondiyo.

Oluphando luyaku ncedisana nesebe lezemfundo ekubeni bathathe ingqwalasela yokubaluleka kokuba kube ezinto zifunekayo nezingu bakwazi ukonyusa isixa-mali sokwalela izikolo ezitsha nezinye ezisilelayo kumagumbi athile.Ootitshala nabo bazakuba ulwazi olungcono lwefuthe lokungabikho kwezakhiwo zesikolo nokunxulumana neziphumo zabafundi.Ndinethemba lokuba isigqeba sesikolo esilawalayo(SGB) siyakuluthathela ingqalelo okungcina izakhiwo zesikolo ngononophelo hayi ngokuthi kubonwe xa konakele kuqale kulungiswe ngeloxesha.

Abafundi banelunge lokuhlonitshwa ngako oko amaga abo azukubhalwa.Inxaxheba yabo kolu phando ixhomekeka kwimvume yabo kuba akukho sinyanzelo soko.Banokungaphenduli mibuzo xa bethanda beselevumile unakho uyeka anagabi yonxenye yophando.Bakugqiba ukufilisha yonke imibuzo kuyakubakho ukhetho lwalowo uyakufu mna isipho(lucky draw) ukuba ayiphedulwanga yonke imibuzo iphepha lakhe aluzofukwa.

Ozithobileyo
Nomava Goduka

Unawo umqondo wolu phando kwaye, Ingaba uyavuma umtwana wakho abe yinxenye yalo(faka u-x kwibhokisi ohambelana nayo)?

ewe	hayi	ewe	hayi

_____   _____
Intsayino   umhla

APPENDIX I: LEARNERS ASSENT FORM

NOMAVA GODUKA

108 BLUEWATER DRIVE | 041 466 8866 | s213221268@MANDELA.AC.ZA

NELS●N M▲NDELA
UNIVERSITY

> The perceptions of learners on the effect of infrastructure development on academic performance in public secondary school

Insert date here

Dear Learners,

I would like to invite you to take part in a research study. This research study will be conducted by myself, a MSc Property Economics and Valuation student at the Nelson Mandela University. The purpose of the study is to investigate the influence of school buildings on academic performance of public secondary schools. The learner's participation will be helpful to better understand their perspective of the influence of school buildings on their academic performance. You will be given a questionnaire to fill in. I will explain the questionnaire beforehand, so you understand the survey clearly. The researcher will be there every step of the way when filling in the questionnaire to clarify any questions.

This study will help the Department of Education to become more aware of the need of new school facilities. Also increasing school budgets to build new schools. Teachers will also have a better understanding of the influence of inadequate school buildings on academic performance. Hopeful the school govern body will become more aware of the need to maintain the facilities regularly not only when they break down.

The you have the right to privacy and confidentiality, therefore your names will not appear on the questionnaire. Your participation in this study is completely voluntary. You may decline to answer any questions and you have the right to withdraw from the study at any time without any consequences. Once you have completed the survey your name will be automatically placed in the lucky draw for a cash prize or hamper. Should you not finish filling in the questionnaire, you won't be placed for the lucky draw. The survey should take no longer than 30 minutes. If you have any queries, please feel free to contact the researcher listed above.

Yours Sincerely,

Nomava Goduka
Researcher

Do you understand this study and are you willing to participate?

| YES | | NO | | YES | | NO |

_____   _____
Signature of learner   Date

APPENDIX J: PRINCIPAL REQUEST LETTER

NELSON MANDELA
UNIVERSITY

• PO Box 77000 • Nelson Mandela University
• Port Elizabeth • 6031 • South Africa • www.mandela.ac.za

The perceptions of learners on the effect of infrastructure development on academic performance in public secondary schools

Project Information Statement/Letter of Invitation to School Principal

My name is Nomava Goduka, and I am a MSc Property Economic and Valuation student at the Nelson Mandela University. I am conducting research on Built Environment under the supervision of Mr Roy Cumberlege. The Provincial Department of Education has given approval to approach schools for my research. A copy of their approval is contained with this letter. I invite you to consider taking part in this research. This study will meet the requirements of the Research Ethics Committee (Human) of the Nelson Mandela University.

Aims of the Research

The research aims to:

- Assess the influence of school infrastructure on learners' academic performance in public secondary schools.

Significance of the Research Project

The research is significant in three ways:

1. The study will be useful to the Department of Education and the Department of Finance in the implementation of policies and strategies for school infrastructure development in public secondary schools.
2. Policy stakeholders will also have recent data to incorporate in updating building standards.
3. It will provide schools and educators with greater understanding about the effect of inadequate infrastructure on academic performance.

Benefits of the Research to Schools

1. The Department of Education will become more aware of the need of school infrastructure development. Hopeful increase the school infrastructure development in public secondary schools.
2. Increase academic performance since educators will have a better understanding on the influence of inadequate infrastructure on academic performance on learners.

Research Plan and Method

A self-completion questionnaire will be given to the respondents for completion and return. Permission will be sought from the learners and their parents prior to their participation in the research. Only those who consent and whose parents' consent will participate. The researcher will be present while the respondent completes the questionnaire to clarify the meanings of questions if required. The questionnaire will take 15-30 minutes maximum. All information collected will be treated in strictest confidence of individual learners will not be identifiable in any reports that are written. Participants may withdraw from the study at any time without penalty. The role of the school is voluntary and the School Principal may decide to withdraw the school's participation at any time without penalty. If a learner requires support as a result of their participation in the survey steps can be taken to accommodate this.

School Involvement

Once I have received your consent to approach learners to participate in the study, I will
- arrange for informed consent to be obtained from participants' parents
- obtain informed consent from participants
- arrange a time with your school for data collection to take place

Further information

If you have any queries please feel free to contact Nomava Goduka at nomavagoduka.ng@gmail.com or 041 466 8866.

Attached for your information are copies of the Parent Information and Consent Form and also the Participant Information Statement and Consent Form.

Invitation to Participate

If you would like your school to participate in this research, please complete and return the attached form.

Thank you for taking the time to read this information.

Nomava Goduka   Mr. Roy Cumberlege
Researcher   Supervisor
Nelson Mandela University   Nelson Mandela University

APPENDIX K: SGB's REQUEST LETTER

NELS●N MA▲NDELA
U N I V E R S I T Y

· PO Box 77000 · Nelson Mandela University
· Port Elizabeth · 6031 · South Africa · www.mandela.ac.za

The perceptions of learners on the effect of infrastructure development on academic performance in public secondary schools

Project Information Statement/Letter of Invitation to School Governing Body

My name is Nomava Goduka, and I am a MSc Property Economic and Valuation student at the Nelson Mandela University. I am conducting research on Built Environment under the supervision of Mr Roy Cumberlege. The Provincial Department of Education has given approval to approach schools for my research. A copy of their approval is contained with this letter. I invite you to consider taking part in this research. This study will meet the requirements of the Research Ethics Committee (Human) of the Nelson Mandela University.

Aims of the Research

The research aims to:

- Assess the influence of school infrastructure on learners' academic performance in public secondary schools.

Significance of the Research Project

The research is significant in three ways:

1. The study will be useful to the Department of Education and the Department of Finance in the implementation of policies and strategies for school infrastructure development in public secondary schools.
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3. It will provide schools and educators with greater understanding about the effect of inadequate infrastructure on academic performance.

Benefits of the Research to Schools

1. The Department of Education will become more aware of the need of school infrastructure development. Hopeful increase the school infrastructure development in public secondary schools.
2. Increase academic performance since educators will have a better understanding on the influence of inadequate infrastructure on academic performance on learners.

Research Plan and Method

A self-completion questionnaire will be given to the respondents for completion and return. Permission will be sought from the learners and their parents prior to their participation in the research. Only those who consent and whose parents' consent will participate. The researcher will be present while the respondent completes the questionnaire to clarify the meanings of questions if required. The questionnaire will take 15-30 minutes maximum. All information collected will be treated in strictest confidence of individual learners will not be identifiable in any reports that are written. Participants may withdraw from the study at any time without penalty. The role of the school is voluntary and the School Principal may decide to withdraw the school's participation at any time without penalty. If a learner requires support as a result of their participation in the survey steps can be taken to accommodate this.

School Involvement

Once I have received your consent to approach learners to participate in the study, I will

- arrange for informed consent to be obtained from participants' parents
- obtain informed consent from participants.
- arrange a time with your school for data collection to take place.

Further information

If you have any queries please feel free to contact Nomava Goduka at nomavagoduka.ng@gmail.com or 041 466 8866.

Invitation to Participate

If you would like your school to participate in this research, please complete and return the attached form.

Thank you for taking the time to read this information.

Nomava Goduka	Mr. Roy Cumberlege
Researcher	Supervisor
Nelson Mandela University	Nelson Mandela University

APPENDIX L: QUESTIONNAIRE

NELSON MANDELA
UNIVERSITY

The perceptions of learners on the effect of infrastructure development on academic performance in public secondary schools

By Nomava Goduka

Department of Construction Management, Nelson Mandela University

---

QUESTIONNAIRE FOR LEARNERS

Dear Learners,

The purpose of this questionnaire is to determine the influence of school infrastructure on academic performance in public secondary schools. The questionnaire has four sections and general questions please answer all the sections below. I assure you that your response will be treated with strict confidentiality and your identity will not be mentioned in this research paper.

Section A: Demographic information

1. How many years have you been schooling at your high school?

   _____

2. Please indicate your gender.

Female	
Male	

3. Please indicate what age category you follow under?

15 years and younger	
16-18 years	
19-20 years	
Older than 21 years	

4. Please indicate your home language.

Xhosa	
English	
Afrikaans	
Other, specify	

1

Section B: Effect of infrastructure on learners' academic performance

Please answer the following questions based on your own perception of your school building and the current facilities. There are no right or wrong answers. Please complete the questionnaire by indicating to what extent you agree or disagree that school infrastructure influence learner's academic performance.

The questions have a scale from 1 to 5 with 1 meaning very low effect and 5 meaning extremely high effect. Answer the question to the extent to which you agree with it.

	1	2	3	4	5	Unsure
1.1 In your opinion, to what extent does the following infrastructure affected your academic performance.						
1.1.1 Classroom						
1.1.2 Laboratories						
1.1.3 Library						
1.1.4 Administration office						
1.1.5 Sports fields						
1.1.6 Play grounds						

The questions have a scale from 1 to 5 with 1 meaning inadequate and 5 meaning extremely high adequacy. Answer the question to the extent to which you agree with it.

	1	2	3	4	5	Unsure
1.2 In your opinion, what is the current state of:						
1.2.1 Classroom						
1.2.2 Laboratories						
1.2.3 Library						
1.2.4 Administration offices						
1.2.5 Sports fields						
1.2.6 Playgrounds						

2

The questions have a scale from 1 to 5 with 1 meaning strongly disagree and 5 meaning strongly agree. Answer the question to the extent to which you agree with it.

	1	2	3	4	5	Unsure
1.3 My classrooms are generally overcrowded.						
1.4 I feel motivated and eager to learn when I enter my classrooms.						
1.5 The physical school building encourages me to attend school every day.						
1.6 Our school has facilities such as lunch areas and sport fields.						
1.7 I was absent from school during this year.						
1.8 The school building is in a good condition; it helps me to perform academically.						

2. Any further comments: ....

....

....

....

....

....

3

123

SECTION C: Insufficient health and safety measures on learner's academic performance

Please answer the following questions based on your own perception of your school building and the current facilities. There are no right or wrong answers. Please complete the questionnaire by indicating to what extent you agree or disagree that insufficient health and safety measures influence learner's academic performance.

The questions have a scale from 1 to 5 with 1 meaning strongly disagree and 5 meaning strongly agree. Answer the question to the extent to which you agree with it.

	1	2	3	4	5	Unsure
1.1 I feel safe at the school grounds.						
1.2 My school has security guards.						
1.3 Anyone can easily access the school grounds.						
1.4 The school teaches fire drills and safety procedures for emergencies.						
1.5 The school has a sickroom or medical kit.						
1.6 The school has enough clean drinking water.						
1.7 The school provides functioning sanitation facilities.						
1.8 Sanitation facilities must improve at our school.						
1.9 In your opinion to what extent does the state of sanitation facilities affect your academic performance.						

2. Any further comments: ....

....

....

....

4

SECTION D: Maintenance on facilities at secondary schools are lacking.

Please answer the following questions based on your own perception of your school building and the current facilities. There are no right or wrong answers. Please complete the questionnaire by indicating to what extent you agree or disagree that maintenance on facilities influence learner's academic performance.

The questions have a scale from 1 to 5 with 1 meaning strongly disagree and 5 meaning strongly agree. Answer the question to the extent to which you agree with it.

	1	2	3	4	5	Unsure
1.1 The school is properly designed for its use.						
1.2 The school building is in a good condition both internally and externally.						
1.3 The school is maintained yearly.						
1.4 Most of the classrooms have windows.						
1.5 The school has adequate lighting systems.						
1.6 The classrooms are painted at least every 2 years						
1.7 Sanitation facilities are maintained often.						
1.8 The maintenance of the school affects my academic performance.						

2. Any further comments ....

....

....

....

5

General

1. What other features/ facilities etc would you include to the current school's infrastructure in order to improve academic performance?

....
....
....
....
....
....

6

APPENDIX M: GRADE 11 MARK ANALYSIS

Douglas Mbopa Senior Secondary School
Summary of Results Analysis - December 2014
Grade 8 - 11

Grade	Wrote	Passed	Failed	% Passed
8	209	145	64	69
9	303	187	116	62
10	317	154	163	49
11	273	164	109	60
Grand Total	1102	650	452	59

DOUGLAS MBOPA HIGH SCHOOL
Summary of Cycle Results   Year : 2015

Quarter 4

Statistics per grade	Gr 8	Gr 9	Gr 10	Gr 11	Gr 12
Number of Learners	270	225	298	272	
Number of Learners Promoted (Passed)	221	184	232	232	
Number of Learners Not Promoted (Failed)	49	41	66	40	
Percentage of Learners Promoted (Passed)	81.85	81.78	77.85	85.29	
Grade Average %	44.40	43.54	41.23	41.80	

2 016

Name of School	GRADE	LEARNER TOTALS (per Grade)				TYPE OF PASS (ONL\	
		No. Registered	No. that Wrote	No. that Passed	No. that Failed	B	D
Douglas Mbopa High School	8	267	267	76	191		
	9	240	240	62	178		
	10	248	248	138	110		
	11	255	255	189	66		
	12	230	230	200	30	38	90

ANALYSIS OF RESULTS : GRADES 8 -

DEPARTMENT OF EDUCATION & CULTURE
DOUGLAS MBOPA HIGH SCHOOL
PO BOX 170, SWARTKOPS, 6210.
CONTROLLED
DEPUTY PRINCIPAL
SIGNATURE: ....
DATE : ......20/11/20 19.

NELSON MANDELA BAY SUMMARY OF PROMOTIONS 2018
DOUGLAS MBOPA HIGH SCHOOL

SCHOOL	GRADE	FEMALE LEARNERS						MALE LEARNERS						TOTALS					
		REG.	ASS.	RP	PG	ADJ	NRP	REG.	ASS.	RP	PG	ADJ	NRP	REG	ASS	RP	PG	ADJ	NRP
	1													0	0	0	0	0	0
	2													0	0	0	0	0	0
	3													0	0	0	0	0	0
	4													0	0	0	0	0	0
	5													0	0	0	0	0	0
	6													0	0	0	0	0	0
	7													0	0	0	0	0	0
DM HS	8	189	189	101	70	18	18	161	161	35	84	11	42	350	350	136	206	29	60
DM HS	9	186	186	38	83	20	65	129	129	23	41	17	65	315	315	61	144	37	130
DM HS	10	152	152	98	20		34	159	159	94	18		47	311	311	192	212		81
DM HS	11	142	142	85	20		55	90	90	52	5		33	232	232	137	139		88

MFESANE HIGH SCHOOL
74 INQU Street
Nu12
MOTHERWELL
PORT ELIZABETH
6211
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EMIS NO: (200100509)
Email: mfesanehigh@gmail.com

GRADE 11 PASS % FOR THE LAST 5 YEARS

2014	2015	2016	2017	2018
65%	44.8	72%	75.3%	82.7%

29 OCT 2019