



Schooling under Unusual Conditions:

Research into how school
infrastructure shapes teaching
and learning in South Africa



Equal Education
 Registered S18A(1) public benefit organisation (PBO)
 Exemption number 930 027 221
 Registered non-profit organisation (NPO)
 Registration number 068-288-NPO

**HEAD OFFICE
 (WESTERN CAPE)**

PO Box 40114, Elonwabeni, 7791
 Isivivana Centre, 2nd Floor

8 Mzala Street, Khayelitsha, 7784

021 361 0127

info@equaleducation.org.za

www.equaleducation.org.za

@equal_education

@equaledu

Equal Education

Equal Education

This report was produced by Equal Education’s Research and Policy department. It was designed and written by Elizabeth Biney, with assistance from Jane Borman and Lynn Chambers. A special thanks to Professor A.Y. Amoateng for externally reviewing initial drafts of this report, and to Jay-Dee Cyster, Katherine Sutherland and Stacey Jacobs for assisting with peer-reviewing and copy-editing.

Report design: Jesi Townsend

**Equal Education would like to thank Investec for contributing financially to this publication.

The contents of this publication are the sole responsibility of Equal Education.

First published in November 2023



EXECUTIVE SUMMARY	4
ABBREVIATIONS	5
INTRODUCTION	6
LITERATURE REVIEW: IMPACT OF SCHOOL INFRASTRUCTURE ON LEARNING OUTCOMES	8
School attendance and learner engagement	10
Teacher attitude and motivation	11
Learners’ academic performance	12
PUBLIC SCHOOLING IN CONTEMPORARY SOUTH AFRICA: A SOCIO-LEGAL CONTEXT	13
National policy and regulatory frameworks for schooling	14
Structure and administration of the schooling system	18
KEY CHALLENGES IN SOUTH AFRICAN PUBLIC SCHOOLING	20
Low educational outcomes	22
Poor infrastructure conditions in South African schools	25
Declining funding or investment in infrastructure	32
RELATIONSHIP BETWEEN SCHOOL INFRASTRUCTURE CONDITIONS AND TEACHING AND LEARNING OUTCOMES IN SOUTH AFRICA: AN EMPIRICAL ANALYSIS	37
Conceptual framework and data	37
Measures and statistical analysis	37
Results of analyses	38
DISCUSSION AND CONCLUSION	46
POLICY IMPLICATIONS AND LIMITATIONS	48

EXECUTIVE SUMMARY

Nearly three decades into democracy, the post-apartheid government is still struggling to undo the inequalities in the schooling system that the apartheid regime created. In many ways, schooling in South Africa has improved as government policies ensure that all children in the country go to school, at least until grade nine. Access to schooling or the attendance rate in the country is near universal, as almost all children who are of school-going age and are meant to be at school are enrolled.

In spite of efforts to transform and expand schooling and the gains made in that regard, the sector still experiences serious challenges that are contributing to a learning crisis in the country. The reality is that the quality of schooling is compromised because learners are not gaining enough of the basic skills and knowledge needed for further education or leading productive lives. A major contributor and often neglected part of this learning crisis is the physical conditions at schools, which are not always favourable to good teaching and learning.

Many times, conversations around the root causes of this learning crisis focus on questions of curricular competencies and teaching resources and approaches, without much attention to school environment exposures that produce or hinder desired outcomes. This research sought to refocus the conversation by looking at the relationship between conditions in the physical school environment and teaching and learning using statistical techniques.

Findings from the analyses largely confirm what we know to be true, as well as other interesting and unexpected ones. Generally, insufficient classroom infrastructure or overcrowding conditions (measured as classes too big/too many learners) emerged as a consistent and important environmental factor at the school level, with a negative impact on motivation for both learners and teachers. Specifically, the results showed that overcrowded conditions increase the likelihood of learners and teachers being absent from school regularly. In addition, and more importantly, it was revealed that teachers' quality of teaching and performance, as well as their general attitude towards their job, are greatly affected by poor school conditions or facilities. This is concerning because teachers remain key to learners' schooling and learning outcomes.

Since learning outcomes in the country are low compared to other countries, together with the high school infrastructure backlogs, government needs to reconsider its efforts and increase investments in improving infrastructure conditions in schools. The findings of the analyses have shown that the physical school environment can serve a dual purpose in tackling the learning crises in the country. This research report provides information on school-level factors that shape teaching and learning in public schools that will be useful for progressive educational policy reforms. Policy recommendations are made.

ABBREVIATIONS

ANA	Annual National Assessment
ASIDI	Accelerated School Infrastructure Delivery Initiative
CAPS	Curriculum and Assessment Policy Statement
COVID-19	Coronavirus disease
DBE	Department of Basic Education
ECD	Early Childhood Development
EE	Equal Education
EIG	Education Infrastructure Grant
FET	Further Education and Training
GET	General Education and Training
GHS	General Household Survey
MEC	Member of the Executive Council
NEIMS	National Education Infrastructure Management System
NEPA	National Education Policy Act
NSC	National Senior Certificate
NSLA	National Strategy for Learner Attainment
PIRLS	Progress in International Reading Literacy Study
SACMEQ	Southern and Eastern Africa Consortium for Monitoring Educational Quality
SAFE	Sanitation Appropriate for Education
SASA	South African Schools Act
SIBG	Schools Infrastructure Backlog Grant
TIMSS	Trends in International Mathematics and Science Study

INTRODUCTION

Education is a protected human right worldwide and a vital tool that yields important benefits far beyond individual empowerment or the acquisition of vital knowledge and skills required for leading productive lives.¹ Education is also essential for the enjoyment of other rights, and a tool for society to achieve development and economic growth.² Realising the right to education is possible through expanding access or opportunities to schooling as well as improving the quality of schooling and related services.³



While many developing countries have improved in expanding access to schooling, it has not produced the expected outcomes as learning levels remain relatively low in these parts.⁴ The importance of quality in schooling cannot be underestimated, as is evident in its inclusion in the United Nations (UN) Sustainable Development Goals (SDGs). Specifically, SDG 4 calls for governments to “ensure inclusive and equitable quality education and promote lifelong learning opportunities for all” by 2030 (emphasis added). This requires that all young people “finish free, equitable and quality primary and secondary education” (emphasis added). Despite their expressed commitments toward SDG 4, quality schooling remains a great challenge for many developing nations, South Africa included. Challenges in achieving quality schooling are because children are not gaining enough of the basic skills and knowledge needed for further education or work. This lack of quality schooling is creating a learning crisis now and a skills gap for the future labour market.



Quality schooling, however we look at it, continues to remain a challenge in sub-Saharan Africa as many children in the region attend schools that are not favourable to learning. Far too many learners attend schools lacking basic infrastructure, including water and hygiene facilities.⁵ The challenge of unequal access to quality schooling is particularly severe in South Africa. Even before the Coronavirus disease (COVID-19) pandemic, many learners attended poorly equipped or maintained schools that did not allow for effective teaching and learning.

Although quality schooling is a complex issue, it is often addressed primarily from an instructional (pedagogical or didactic) perspective to stress how investments in qualified teachers, learning methods and resources improve outcomes. However, this singular approach to improving schooling quality is problematic because teaching and learning do not happen in a vacuum but within a particular environmental context. Thus, the school environment—including the physical buildings or space, and basic services such as water and sanitation facilities (school infrastructure)—are not just physical necessities but important means to good teaching and learning outcomes. This research report, therefore, explores the idea that the provision of resource inputs in the physical teaching and learning environment, key elements of which include infrastructure and basic services like water and sanitation, greatly influence schooling outcomes.



Accordingly, this research report uses multiple data sources and approaches (triangulation) to develop a detailed understanding of factors impacting teaching and learning in South Africa. Firstly, it analyses existing policy and legal frameworks to provide a broad overview of the school infrastructure conditions and related services in South African public schools. Secondly, it uses statistical techniques to assess the effects of school infrastructure conditions and identify predictors of schooling outcomes using available nationally representative cross-sectional data.



In doing so, the research report draws on core primary (legislation, policy documents and demographic surveys) and secondary (books, articles, reports, and commentaries) sources to achieve two main purposes. Firstly, it consolidates the existing knowledge on how physical learning environments affect teaching and learning outcomes in the South African context. Secondly, it contributes broader and context-specific knowledge to existing evidence on the connection between school infrastructure and teaching and learning. The content of the report, therefore, will be a useful resource and advocacy tool for the basic education sector.

¹ Barrett, P., Treves, A., Shmis, T., Ambasz, D. & Ustinova, M. 2019. *The impact of school infrastructure on learning: A synthesis of the evidence*. International development in focus. Washington, DC: World Bank; World Bank. 2018. *World development report 2018: Learning to realise education's promise*. Washington, DC: World Bank.

² Sithole, R. (2019). The value of education. Fundza Literacy Trust. <https://live.fundza.mobi/home/fanz/essays/the-value-of-education/> Accessed 29 June 2021.

³ Ngwaru, J.M. & Oluga, M. 2015. Educational infrastructure and resources for sustainable access to schooling and outcomes: The case of early literacy development in southern Tanzania. *Africa Education Review*, 12(1): 88–108.

⁴ United Nations Children's Fund (UNICEF). 2020. *Addressing the learning crisis: An urgent need to better finance education for the poorest children*. New York: UNICEF.

⁵ Kronke, M. & Olanig, L. 2020. *Democratic dividend: The road to quality education in Africa*. Afrobarometer Policy Paper No. 63.

LITERATURE REVIEW:

IMPACT OF SCHOOL INFRASTRUCTURE ON LEARNING OUTCOMES

Research on learning outcomes often focuses on such policy issues as curricular and associated education resources and practices. Yet, school infrastructure conditions—the physical learning space or building and related basic services, its quality, maintenance and management—are vital for learning outcomes and important in ensuring the provision of quality schooling because structured teaching and learning primarily occur within a physical context, the school environment.⁶ Therefore, the condition of school infrastructure—the physical building as well as related facilities and services—can either improve or worsen teaching and learning.⁷

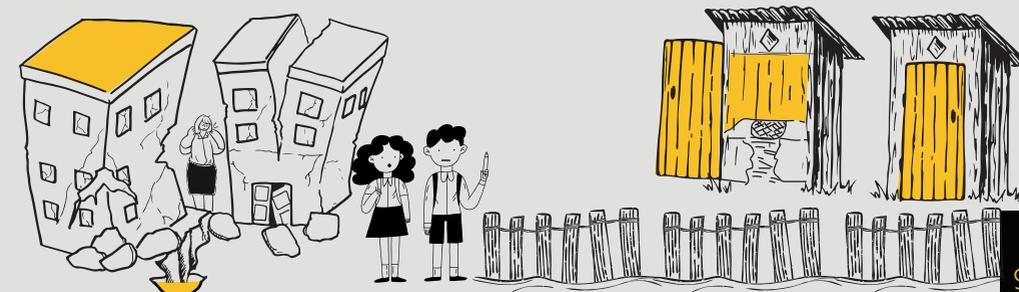
School infrastructure is broadly defined to include the availability, quality and or condition of the physical building or learning space and related services such as sanitation and water facilities that aid the provision of education.⁸ While infrastructure can take different forms or types, it can largely be classified as either adequate/good or inadequate/poor. However, the conditions for what qualifies as quality school infrastructure are determined or guided by standards set by a country's Ministry of Education. In South Africa, for instance, the national Department of Basic Education (DBE), through the Regulations Relating to Minimum Norms and Standards for Public School Infrastructure policy, sets out the basic conditions that schools must have to be acceptable for teaching and learning.

It is clear that there is a strong relationship between school infrastructure and safety. Globally, it is recognised that quality and appropriate infrastructure and facilities contribute to the proper functioning of schools and create safe, healthy and good learning environments for both learners and teachers.⁹ Alternatively, poor school infrastructure—overcrowding, hazardous building material, lack of maintenance, poor or non-existent sanitation facilities, lack of clean water for drinking and hygiene—continues to risk learners' physical and mental well-being at schools. In South Africa, the health and safety implications of school infrastructure have been extensively reported on.¹⁰

However, research exploring the connection between school infrastructure and schooling outcomes is fragmented and limited. Removing a discussion about the physical conditions of schools from the conversation on quality schooling is troubling because many of the factors that contribute to the health and safety of the physical learning environment also significantly affect teaching and learning.¹¹ Although there is increasing research on the impact of school infrastructure on schooling outcomes, very few of this research focuses on South Africa. The few existing national studies tend to be outdated or limited in scope either in the use of smaller samples, or questions that narrowly focus on one aspect of school infrastructure.¹² Therefore, there is a need for a broader approach to investigating the impact of the physical conditions of schools and related facilities and services on schooling generally.

Limitations aside, emerging literature has identified quality infrastructure as equally important for schooling outcomes as other factors like access, quality of teachers, or individual and household/community-level factors.¹³ The broad consensus is that the physical condition of schools is strongly linked to teaching and learning outcomes, affecting how and what gets taught in schools and how learners receive, participate, and achieve expected academic performance.

In general, the evidence indicates that the physical conditions of a school impact teaching and learning in three ways: school attendance and learner engagement, teacher attitude and motivation, and learners' academic performance. The following sections briefly discuss these three aspects relating to school infrastructure. This review narrowly focuses on the conditions of the physical infrastructure within the immediate school environment.



⁶ Khumalo, B. & Mji, A. 2014. Exploring educators' perceptions of the impact of poor infrastructure on learning and teaching in rural South African schools. *Mediterranean Journal of Social Sciences*, 20(4), 1521-1532. See also Barrett et al. (2019).

⁷ See Khumalo & Mji, 2014.

⁸ Murillo, F.J. & Román, M. 2011. School infrastructure and resources do matter: Analysis of the incidence of school resources on the performance of Latin American students. *School Effectiveness and School Improvement*, 22(1), 29-50.

⁹ Earthman, G. 2004. *Prioritization of 31 criteria for school building adequacy*. Baltimore, MD: ACLU; Jones, S.E., Brener, N.D. & McManus, T. 2003. Prevalence of school policies, programs, and facilities that promote a healthy physical school environment. *American Journal of Public Health*, 93(9): 1570-1575; UNICEF. 2010. *Raising clean hands: Advancing learning, health and participation through WASH in schools*. New York: UNICEF.

¹⁰ See for example EE's reports: Breaking the cycle: Uncovering persistent sanitation challenges in gauteng schools. (November 2018) Available at: <https://equaleducation.org.za/wp-content/uploads/2018/11/Equal-Education-GP-Sanitation-Audit-Report-2018.pdf>; Dikolo tša go hloka seriti (Schools Without Dignity): An Equal Education report on the provision of water and sanitation in Limpopo schools. (November 2017) Available at: <https://equaleducation.org.za/wp-content/uploads/2016/07/EE-Limpopo-School-Visits-Report-Revised-Version-03-o8-18.pdf>; Tshedimošo mo dikolong tša go hloka seriti (A review of Schools without Dignity): Limpopo school visits. (November 2022) Available at: <https://equaleducation.org.za/wp-content/uploads/2022/11/Limpopo-Report-Draft07-Digital-Spreads-medium.pdf>.

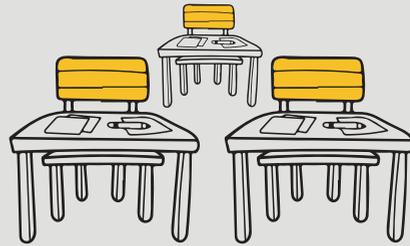
¹¹ See Barrett et al., 2019.

¹² Van Wyk, P.C. 2008. The didactically neglected child. In J.A. Kapp (ed.). *Children with problems: An orthopedagogical perspective*. Pretoria: Van Schaik, pp. 133; West, J. & Meier, C. 2020. Overcrowded classrooms – The Achilles heel of South African education? *South African Journal of Childhood Education*, 10(1): 4617.

¹³ See Murillo & Román, 2011.

School attendance and learner engagement

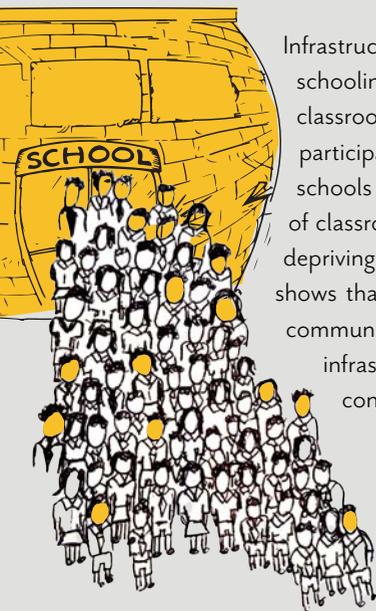
Several international empirical studies have found that the availability and condition of school infrastructure have significant effects on school attendance, engagement and completion.¹⁴ Generally, these studies show that learners in schools with poor infrastructure or facilities (i.e., structural disrepair, temporary structures and inadequate services) are less likely to go to school every day, complete the academic cycles or continue with their education in the long run. The opposite is also true because good infrastructure has been linked to lower learner absenteeism and school dropout rates.¹⁵



Infrastructure affects learner participation and engagement in the schooling system in many ways. For example, insufficient or inadequate classroom infrastructure can affect learner enrolment and the subsequent participation of some children in the schooling system. Thus, where schools have reached full capacity or are overcrowded because of a lack of classroom infrastructure or space, children may be refused admission, depriving them of their right to education. In South Africa, research shows that learners from rural, marginalised or densely populated urban communities (i.e., townships) bear the greatest impact of poor classroom infrastructure as they are mostly affected by overcrowded school conditions.¹⁶

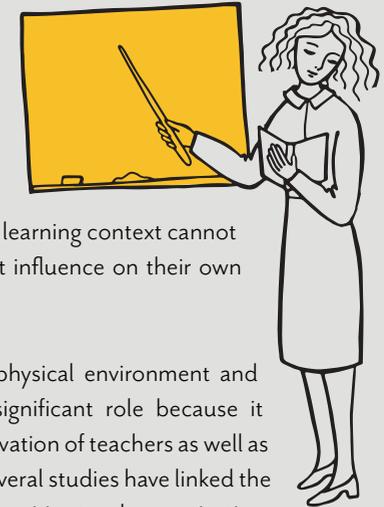
Moreover, insufficient or inadequate facilities like toilets and water at schools are known to have a negative impact on older children's school attendance and retention, particularly female learners. Evidence indicates that girls who have begun menstruation are more likely to miss significant amounts of school if sanitation

facilities are poor or non-existent.¹⁷ Thus, poor school facilities can endanger the education and potential future of some children and can be seen as discriminatory towards learners who menstruate.



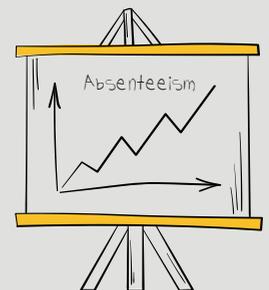
Teacher attitude and motivation

Generally, it is recognised that teachers play a crucial role in learning outcomes as the quality of teaching affects how and what children learn. Aside from the obvious educational contribution of teachers to learning outcomes, their presence or availability in the teaching and learning context cannot be understated. The experiences of teachers have a direct influence on their own performance and that of learners.



School infrastructure, or the physical environment and learning conditions, plays a significant role because it shapes the availability and motivation of teachers as well as the quality of their teaching. Several studies have linked the quality of school facilities with positive teacher motivation, attitudes, attendance and retention, which in turn affect their ability to deliver quality teaching; all of which impact learning and academic performance.¹⁸ This is because proper infrastructure creates motivating and comfortable working conditions for teachers, which in turn leads to the provision of better services to learners. The state of school infrastructure is found to be a better determinant of teacher attendance than salaries.¹⁹ Good or quality school infrastructure has been found to reduce teacher absenteeism significantly.²⁰

Evidence from South Africa supports this observed impact of school infrastructure on teachers, showing that insufficient classroom infrastructure—measured as overcrowded classrooms—contributes to teachers' inability to pay enough attention to individual learners' education needs,²¹ negative teacher attitudes,²² and low learner performance.²³



¹⁴Boese, S. & Shaw, J. 2005. *New York state school facilities and student health, achievement and attendance: A data analysis report*. New York: Healthy Schools Network, Inc; Branham, D. 2004. The wise man builds his house upon the rock: The effects of inadequate school building infrastructure on student attendance. *Social Science Quarterly*, 85(5): 1112-1128; Duran-Narucki, V. 2008. School building condition, school attendance, and academic achievement in New York City public schools: A mediation model. *Journal of Environmental Psychology*, 28(1): 278-286.

¹⁵See Barrett et al., 2019; Branham, 2004.

¹⁶See No space for us: Understanding overcrowding in Gauteng schools. (August 2021) Available at: <https://equaleducation.org.za/wp-content/uploads/2022/03/equal-education-no-space-for-us-overcrowding-report-digital-sgl-page-compressed-20211015.pdf>

¹⁷Murtaza, A. 2012. *Lack of sanitation facilities in schools – An obstacle in girls' education*. Pakistan: Asian Human Rights Commission. Available from: <https://reliefweb.int/report/pakistan/lack-sanitation-facilities-schools-obstacle-girls-education>

¹⁸See for example Buckley, J., Schneider, M. & Shang, Y. 2005. *Fix it & they might stay*. School facility quality and teacher retention in Washington, D.C. *Teachers College Press*, 107(5): 1107-1123; Chaney, B. & Lewis, L. 2007. *Public school principals report on their school facilities*. Washington, DC: National Center for Education Statistics, Institute of Education Sciences; Earthman, G.I. & Lemasters, L.K. 2009. Teacher attitudes about classroom conditions. *Journal of Educational Administration*, 47(3): 323-335; Schneider, M. 2003. *Linking school facility conditions to teacher satisfaction and success*. Washington, DC: National Clearinghouse for Educational Facilities.

¹⁹Chaudhury, N., Hammer, J., Kremer, M., Muralidharan, K. & Rogers, F.H. 2006. Missing in action: Teacher and health worker absence in developing countries. *Journal of Economic Perspectives*, 20(1): 91-116; Thomas, J., & Pasquale, L.A. 2016. *Better spaces for learning*. London: RIBA.

²⁰See Chaudhury et al., 2006.

²¹Marais, P. 2016. We can't believe what we see: Overcrowded classrooms through the eyes of student teachers. *South African Journal of Education*, 36(2): 1-10.

²²See West & Meier, 2020.

²³Ndebele, T. 2014. Education. In F. Cronje, J. Kane-Berman & L. Moloi (eds.), *South Africa survey 2014/2015*. Johannesburg: Institute of Race Relations, pp. 419-530.

Learners' academic performance

The physical environment of schools and the availability of facilities, resources and services ultimately impact the academic performance of learners. Research done mainly in the United States shows that school infrastructure has a direct relationship with academic performance, with quality infrastructure improving learners' performance or achievement in standardised tests.²⁴

Developing nations have also documented similar positive links between good school infrastructure and academic performance. For instance, a study of 95,000 Grade 3 and 91,000 Grade 6 learners from 16 countries in Latin America found that the availability of basic infrastructure and services (water, electricity, sanitation) and educational facilities (sports facilities, laboratories, libraries) in schools affect the achievements of primary school learners.²⁵ Similar findings are emerging in South Africa.²⁶



The relationship between infrastructural conditions and academic achievement is also a question of equality as poor infrastructure is often found in the poorest communities of school districts in both urban and rural areas.²⁷

PUBLIC SCHOOLING IN CONTEMPORARY SOUTH AFRICA:

A SOCIO-LEGAL CONTEXT

The current state of schooling, including the conditions of school infrastructure, must be seen within the bigger picture of the country's political history. During apartheid, education, like other socio-economic rights, was used as a political tool to discriminate against and promote the underdevelopment of black and coloured communities in mostly rural and peri-urban provinces.

Using unequal funding practices and discriminatory policies such as the 1953 Bantu Education Act, for instance, the apartheid government deliberately provided black African and coloured children with inferior and under-resourced schools.²⁸ Each of the four population groups (races)—white, black African, Indian/Asian and coloured—had separate schooling and infrastructure provided for them. This resulted in an uneven schooling system with separate schooling infrastructure for the different racial groups as well as a clear urban-rural divide.²⁹ The skewed split between the majority of the system, which has traditionally serviced the black people, and the historically privileged former white schools was a key aspect of the schooling system under apartheid.³⁰ In short, apartheid created a dual schooling system that has been difficult to undo.³¹

The persistent unequal or dual schooling system inherited from apartheid is aptly described by Fiske and Ladd in their comment:

“South Africa's experience is compelling because of the magnitude and starkness of the initial disparities and of the changes required. Few, if any, new democratic governments have had to work with an education system as egregiously- and intentionally inequitable as the one that the apartheid regime bequeathed to the new black-run government in 1994. Moreover, few governments have ever assumed power with as strong a mandate to work for racial justice. Thus, the South African experience offers an opportunity to examine in bold relief the possibilities and limitations of achieving a racially equitable education system in a context where such equity is a prime objective.”³²

²⁴ See e.g., Duran-Narucki, 2008; Tanner, K. 2009. Effects of school design on student outcomes. *Journal of Educational Administration*, 47(3): 376–394.

²⁵ See Murillo & Román, 2011.

²⁶ See e.g., Banda, F. & Kirunda, R. 2005. Factors affecting the initial literacy development of urban and rural learners in the Iganga district, Uganda. *Per Linguam: A Journal of Language Learning*, 21(2): 1-22; Ndebele, 2014.

²⁷ See Earthman, 2004.

²⁸ See Khumalo & Mji, 2014.

²⁹ Morrow, W.E. 1990. Aims of education in South Africa. *International Review of Education*, 36: 171–181.

³⁰ van der Berg, S. & Gustafsson, M. 2019. Educational Outcomes in Post-apartheid South Africa: Signs of Progress Despite Great Inequality. In: Spaull, N. & Jansen, J. (eds) *South African Schooling: The Enigma of Inequality. Policy Implications of Research in Education*, vol 10. Springer, Cham, pp. 25-45.

³¹ McKay, T.M. 2015. Schooling, the underclass and intergenerational mobility: A dual education system dilemma. *TD. The Journal for Transdisciplinary Research in Southern Africa*, 11(1): 92-112; Spaull, N. (2019). Equity: A Price Too High to Pay?. In: Spaull, N., Jansen, J. (eds) *South African Schooling: The Enigma of Inequality. Policy Implications of Research in Education*, vol 10. Springer, Cham, pp. 1-24.

³² Fiske, E.B. & Ladd, H.F. (2004). *Elusive equity: Education reform in post-apartheid South Africa*. Washington, DC: Brookings Institution Press, p. x.

Since democracy in 1994, the post-apartheid government, through changes in the laws, has tried to correct the inequality apartheid created in education. In this regard, the government has made considerable progress in expanding educational access and opportunity at all levels, particularly for black children and adolescents.³³ Yet, the provision of quality education remains highly unequal in South Africa as the education system is still battling persistent inequalities that contribute to gaps in school outcomes between rich and poor learners.³⁴

Before exploring the challenges and crises in the sector today, it is useful to have a brief overview of the structure of the schooling system and how schooling is administered and regulated. Accordingly, the following sections will broadly discuss the South African schooling system, looking at the structure and administration of public schooling in the country, the legal and policy frameworks regulating education broadly and school infrastructure in particular.

National policy and regulatory frameworks for schooling

The South African Constitution recognises schooling as a fundamental human right that requires government to actively take steps to promote and fulfil.³⁵ Unlike other socio-economic rights, the right to schooling is an immediately realisable right. This means that the Constitution emphasises the urgent need for government to provide equal education to all learners.

Although not explicitly mentioned in the Constitution itself, the courts have ruled that school infrastructure is fundamental to the realisation of learners' broader right to schooling. For instance, in *Head of Department, Mpumalanga Department of Education & another v Hoërskool Ermelo & another* (2009), the Constitutional Court stressed that:

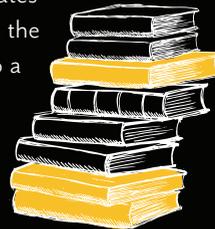
“The most abiding and debilitating legacy of our past is an unequal distribution of skills and competencies acquired through education. In an unconcealed design, the Constitution ardently demands that this social unevenness be addressed by a radical transformation of society as a whole and of public education in particular.”

The Constitution promotes the end to racially-separated schools and the provision of quality schooling to all. To this end, the post-apartheid government has adopted and implemented several laws, policies and strategies that seek to expand access, create equity, and improve quality in the schooling system. Schools are now racially integrated into a unified system, and the allocation of public funds to schools is considerably redressed.³⁶

Aside from the Constitution, several important educational laws and policies work to govern schooling in South Africa. Two of these—namely, the National Education Policy Act, Act 27 of 1996 and the South African Schools Act, Act 84 of 1996—are the core laws giving effect to the right to schooling enshrined in the Constitution. The National Education Policy Act (NEPA) sets out the main responsibilities of the Minister of Basic Education and coordinates the relationship between the national and provincial officials. More importantly, the NEPA broadly regulates school admissions to ensure all children have access to a school.

The South African Schools Act (SASA), on the other hand, sets out a uniform system for the organisation, governance and funding of schools. The SASA, like the Constitution, protects learners' right of access to schooling without discrimination and makes the education of children, at least up until Grade 9 level, compulsory. As a supplement, each of the nine provincial education departments has adopted specific provincial education Acts, similar to the SASA, that provide for the specific educational needs of their relevant province. For example, the Eastern Cape Department of Education has the Eastern Cape Schools Education Act; the Western Cape Department of Education also has the Western Cape Provincial School Education Act.

Together, these policy decisions by the government have helped to improve and expand schooling access, ensuring that every child can attend school—a significant improvement from apartheid-era policies. For instance, the 2019 General Household Survey data show improved trends across the three components of basic education—access to early childhood development (ECD), primary school attendance and secondary school attendance.³⁷ Specifically, it showed that ECD or preschool enrolment increased to nearly 37%, while primary and secondary school attendance was at 99% and 90% respectively.



³³ See McKay, 2015.

³⁴ Organisation for Economic Co-operation and Development (OECD), 2015a. *Education and skills: Improving the quality and relevance of skills*. South Africa Policy Brief. OECD Publishing.

³⁵ Republic of South Africa, 1996. *Constitution of the Republic of South Africa, Act 108 of 1996*. Pretoria: Government Printers.

³⁶ See McKay, 2015.

³⁷ Statistics South Africa, 2020. *General Household Survey 2019*. Pretoria: Statistics South Africa.

Although expanding schooling opportunities is very important, the right to basic education is not just about access. A crucial part of the right is its quality. Thus, the right to basic education as provided for in the Constitution is also a right to quality schooling. According to UNICEF,³⁸ good quality education includes, among others, good teaching and learning processes, as well as a safe and healthy learning environment, with adequate water and sanitation facilities (school infrastructure). Therefore, both poor outcomes and poor school infrastructure violate the right to quality schooling.

The DBE has acknowledged the importance of infrastructure in supporting teaching and learning in its 2019 report, “25 Year Review of Progress in the Basic Education Sector”,³⁹ where it stated:

“The development of children is influenced by the physical and social environments they find themselves in. In the education sector, school infrastructure is important in facilitating the delivery of education and creating an atmosphere conducive for learning.”

The need to improve both school infrastructure and learning outcomes is also recognised in the country’s vision for education reform contained in both the National Development Plan 2030 (NDP) and the Basic Education Sector Plan: *Action Plan 2019 - Towards the Realisation of Schooling 2030* (hereafter “Education Action Plan”). Broadly, the NDP envisages a South Africa with increased access to quality basic education and improved learning outcomes by 2030. The Education Action Plan contains 27 schooling goals and indicators for monitoring and tracking progress in the schooling system towards realising quality education and learning outcomes.

Both the NDP and Education Action Plan are a sign of the government’s recognition of the role quality schooling plays in addressing the country’s socio-economic needs. The quality of learning outcomes or performance in the country as measured through the volume and throughput rates are monitored using aggregated results from the National Senior Certificate, the Annual National Assessments (ANA) and other notable regional and international benchmarking assessments.

In recognising that the apartheid education curricula impacted and continue to impact learning outcomes in the country, the DBE introduced and implemented two important interventions to transform the national curriculum and the quality of teaching in schools: namely, the 2012 Curriculum and Assessment Policy Statement (CAPS) and the 2015 National Strategy for Learner Attainment (NSLA). CAPS is a comprehensive policy document that aims to improve teaching and learning processes in three main ways: i) strengthen the curriculum, ii) specify the knowledge and skills that learners must acquire in each subject area, and iii) make assessment clear and easy to manage. The NSLA supplements CAPS in supporting teaching and learning for a sustained improvement in school education outcomes.

Although the Constitution does not make explicit reference to school infrastructure, the courts have emphasised the importance of good school infrastructure in realising the constitutional right to basic education. In this respect, the Eastern Cape High Court, in *Madzodzo and Others v Minister of Basic Education and Others*, has reaffirmed that:

The state’s obligation to provide basic education as guaranteed by the Constitution is not confined to making places available at schools. It necessarily requires the provision of a range of educational resources: - schools, classrooms, teachers, teaching materials and appropriate facilities for learners. It is clear [...] that inadequate resources in the form of insufficient or inappropriate desks and chairs in the classrooms in public schools across the province profoundly undermines the right of access to basic education.⁴⁰

Another important goal contained in the Education Action Plan is for all South African schools to have spacious, functional, safe and well-maintained infrastructure and physical environments that inspire teaching and learning. Towards achieving these infrastructure priorities, the Minister of Basic Education signed into law the 2013 Regulations Relating to Minimum Uniform Norms and Standards for Public School Infrastructure (hereinafter “Norms and Standards for School Infrastructure”).

³⁸ UNICEF. 2014. Child rights education toolkit: Rooting child rights in early childhood education, primary and secondary schools. Geneva: UNICEF.
³⁹ DBE. 2019. 25 Year Review of Progress in the Basic Education Sector. Pretoria: DBE.

⁴⁰ *Madzodzo and Others v Minister of Basic Education and Others* 2004(3) SA 441 (ECM), para 20.

As the primary legal framework regulating the provision of infrastructure in South African public schools, the Norms and Standards for School Infrastructure set out the national guidelines for the equal provision of basic infrastructure and services to schools within specific timeframes. According to this policy,⁴¹ the national and provincial education departments are, among other things, to ensure that all schools in the country:



- built of inappropriate materials (such as mud, zinc, asbestos) are replaced to ensure health and safety;
- have adequate access to clean water, sanitation and electricity supply;
- with plain or basic pit latrines are replaced with safe sanitation facilities;
- have sufficient space, with a classroom having no more than 40 learners;
- have proper perimeter fencing and security; and
- have libraries, laboratories, internet connectivity, and sporting facilities.

Compliance with the above and other goals stated in the Norms and Standards for School Infrastructure will ensure the supply of physical infrastructure and improve schools' capacity to provide quality teaching and learning.

Structure and administration of the schooling system

Schooling in South Africa occurs over a 12-year period (Grades 1 to 12). The schooling system is further divided into two broad bands: the General Education and Training (GET or primary school system) band which includes Grades 1 to 9, and the Further Education and Training (FET or secondary/high school system) band which includes Grades 10 to 12. The GET band is further divided into three phases: the foundation phase (Grades 1-3), the intermediate phase (Grades 4-6) and the senior phase (Grades 7-9).

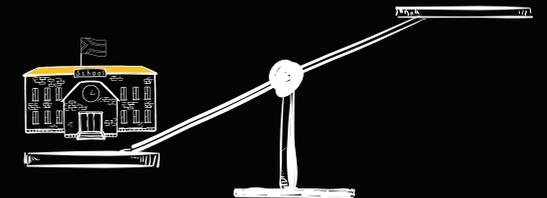
Further, all public ordinary schools in South Africa are placed into five groups or quintiles based on the economic status (poverty) of both the community and the school, ranging from the

poorest (quintile 1) to the least poor (quintile 5).⁴² Schools in quintiles 1 to 3 are no-fee paying or cannot charge fees and are, therefore, fully funded by the government. Schools in quintiles 4 and 5 are fee-paying, allowing these schools to charge fees. This quintile system aims to fix the inequalities in educational funding created during apartheid. It forms the foundation of the government's equitable public spending on schooling by determining the amount of money allocated to a school. As a result, no-fee schools (quintiles 1, 2 and 3) receive more money from government per learner than fee-paying schools (quintiles 4 and 5). The quintile ranking is also linked to the physical infrastructure at a school and has a potential impact on the quality of teaching and learning.⁴³

Concerning administration, the Constitution makes schooling or basic education in South Africa a concurrent government function. This means that schools are managed and administered on three levels—national, provincial and district—in line with the three-tier system of government found in section 40(1) of the Constitution. Nationally, the DBE, headed by the Minister of Basic Education, is responsible for governing schools and providing policies in the sector broadly, as well as providing oversight of schooling delivery across the country.

Each of the nine provinces of South Africa, under the leadership of Members of the Education Councils (MECs), have education departments to oversee and manage schools as well as coordinate and run education programmes within their respective provinces in line with the broader national DBE policies. Each province is given a full budget to operate, including the provision of infrastructure in schools. Provinces are divided into education districts for easy management; these districts are further divided into education circuits, forming a link between schools, districts and provincial education departments.

Despite the government's efforts to improve the education system and related outcomes, South Africa still has one of the most unequal schooling systems in the world. The following section discusses some of the challenges affecting basic education, especially in relation to learning outcomes and infrastructure conditions.



⁴¹ DBE, 2013, *Regulations Relating to Minimum Norms and Standards for Public School Infrastructure*. Government Gazette No. 37081. Pretoria: Government Printing Works.
⁴² The poverty indicators considered in determining a school's quintile include: income; unemployment rate and the level of education of the community. See also Van Dyk, H. & White, C.J. 2019. Theory and practice of the quintile ranking of schools in South Africa: A financial management perspective. *South African Journal of Education*, 39(1): 51-59.

⁴³ van Dyk & White, 2019.

KEY CHALLENGES IN SOUTH AFRICAN PUBLIC SCHOOLING

In tracing the journey from how apartheid-era educational inequalities continue to impact schooling outcomes presently, it is important to understand the current state and condition of school infrastructure and some of the key challenges in the schooling system and sector broadly. In many ways, schooling in South Africa has improved in nearly all the key international dimensions: access, redress, equity, and quality.

Firstly, access to schooling, as measured by the attendance rate of learners of the compulsory school-going age (Grades 1 to 9), is nearly universal for all children of school-going age in South Africa. Analysis of enrolment trends since 2009 shows steady growth in schooling access, suggesting that almost all children who are of school-going age who are meant to be at school are enrolled in an educational institution (see Figure 1 below). Similarly, legislative reforms as previously indicated have considerably assisted in redressing the schooling system and removed discriminatory policies and practices to create a unified system.

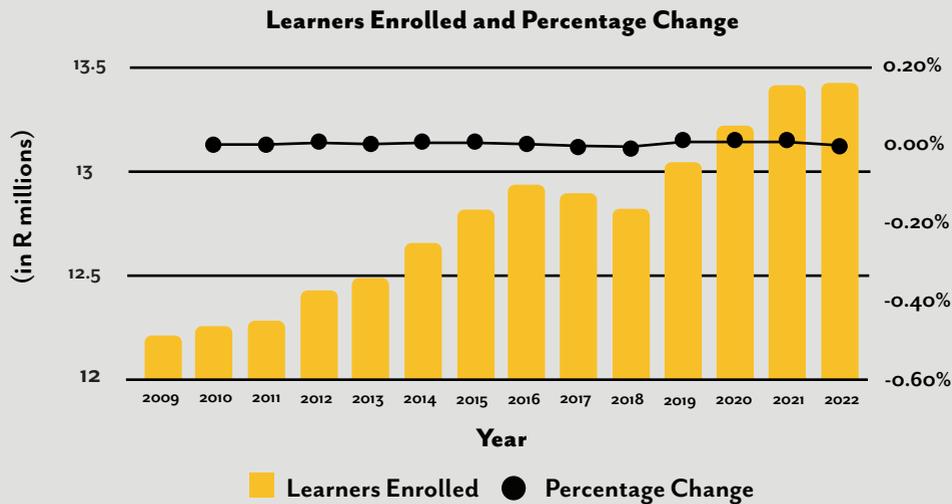
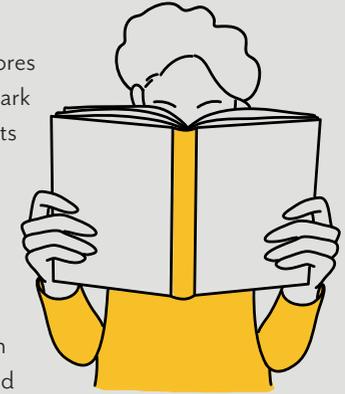


Figure 1: School enrolment trends vs. percentage change from 2009 to 2022
Source: Author’s own computation using data extracted from the DBE’s school realities reports.

In addition, schooling quality, as measured by learner test scores or performances in international and national benchmark assessments, has relatively improved. For example, the results from the 2019 Trends in International Mathematics and Science Study (TIMSS) results showed a substantive improvement in the mathematics and science performance of Grade 9 learners in South Africa.⁴⁵ Similarly, trends in the Progress in International Reading Literacy Study (PIRLS) also showed slight improvements in reading literacy in South Africa between 2006 and 2016, although this upward trend has not been sustained.⁴⁶



Locally, trends in the National Senior Certificate (NSC) examination results indicate significant progress in schooling outcomes, with the number of NSC passes in 2019 nearly doubling from the 1995 record of 283 742.⁴⁷ Further, the number of learners attaining a Bachelor’s pass—a requirement for enrolment for a Bachelor’s degree—in 2019 more than doubled from the 80 000 recorded in 1995.⁴⁸ However, this indicator alone does not adequately reflect schooling quality in the country.

Despite various national measures that have been taken to improve the provision of quality schooling, the equity dimension lags behind as the schooling system is still highly unequal in South Africa. This is because the schooling system remains deeply rooted in historical inequality characterised by skewed infrastructure challenges that contribute to uneven outcomes in South African schools.⁴⁹ For instance, grade repetition is a persistent challenge plaguing the efficiency of the schooling system. Accordingly, this section explores some of the key challenges experienced in the basic education or schooling sector relating to learning outcomes and infrastructure and their underlying drivers.

⁴⁴ DBE, 2021. *General Household Survey: Focus on schooling 2019*. Pretoria: Department of Basic Education. <https://www.education.gov.za/Portals/0/Documents/Reports/DBE%2025%20Year%20Review%20Report%202019.pdf?ver=2019-12-13-133315-127>

⁴⁵ Reddy, V., Winnaar, L., Arends, F., Juan, A., Harvey, J., Hannan, S. & Isdale, K. 2022. *The South African TIMSS 2019 Grade 9 results: Building achievement and bridging achievement gaps*. Cape Town: HSRC Press. <http://hdl.handle.net/20.500.11910/19286>

⁴⁶ Gustafsson, M. 2020. *A revised PIRLS 2011 to 2016 trend for South Africa and the importance of analysing the underlying microdata*. Stellenbosch University: Stellenbosch Economic Working Papers: WP02/2020. Available from: <https://resep.sun.ac.za/3989-2/>

⁴⁷ See DBE, 2021.

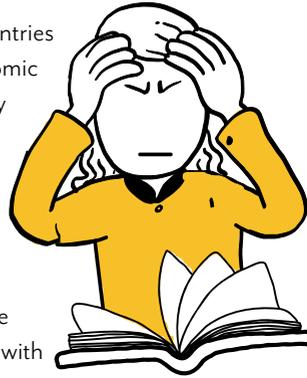
⁴⁸ See DBE, 2021.

⁴⁹ See OECD, 2015a; West & Meier, 2020.

Low educational outcomes

Comparatively, learning outcomes in the country are still low by all the international assessments of education quality in which South Africa participates—the Progress in International Reading Literacy Study (PIRLS), the Trends in International Mathematics and Science Study (TIMSS), and the Southern and East Africa Consortium for Measuring Educational Quality (SACMEQ).

For instance, South Africa’s education system ranked 75 out of 76 countries in a 2015 skills survey conducted by the Organisation for Economic Co-operation and Development.⁵⁰ The most recent reading literacy results from the international comparative test measuring reading achievement at Grade 4 level, the 2021 PIRLS, show that eight out of every ten (81%) Grade 4 children in South Africa cannot read for meaning in any language, a significant drop from the 2016 score of 78%.⁵¹ Although learning losses caused by the COVID-19 pandemic may have contributed to this decline in reading literacy, the 2021 PIRLS result is not only indicative of a sector losing ground with regard to literacy but one that is also battling quality challenges.



Similarly, South African Grade 4 and 8 learners underperformed in international comparative mathematics and science assessments in the 2019 TIMSS.⁵² Likewise, in the fourth standardised regional survey assessing Grade 6 learners’ literacy and numeracy abilities across 15 countries in southern Africa, the 2013 SACMEQ IV survey, South Africa placed 9th for literacy and 6th for numeracy.⁵³

Even though there are significant critiques surrounding it locally and what it means so far as quality schooling is concerned, the result of the Grade 12 National Senior Certificate examination (hereafter “Matric results”) is often used as the simplest indicator to gauge the quality of the schooling system. Using the overall performance in the NSC examinations—per the overall traditional pass rate—as a proxy indicator of learning outcomes shows a sector on the rise.

For instance, trends analysis of matric performance levels from 2016 to 2022 shows steady improvements across the board, although with significant provincial variations (see **Table 1 below**). It is worth noting that rural provinces are often clustered at the lower end of provincial performance rankings.

Table 1. Provincial and national NSC examination pass rates from 2016 to 2022

Province	2016	2017	2018	2019	2020	2021	2022
Eastern Cape	59 (19)	65 (23)	71 (27)	77 (32)	68 (30)	73 (34)	77 (37)
Free State	88 (36)	86 (35)	88 (38)	88 (39)	85 (41)	86 (40)	89 (43)
Gauteng	85 (36)	85 (36)	88 (44)	87 (45)	84 (45)	83 (44)	84 (43)
Kwa-Zulu Natal	66 (25)	73 (29)	76 (33)	81 (38)	78 (38)	77 (37)	83 (43)
Limpopo	63 (18)	66 (21)	69 (24)	73 (27)	68 (29)	67 (27)	72 (30)
Mpumalanga	77 (23)	75 (23)	79 (30)	80 (33)	74 (30)	74 (32)	77 (34)
North West	83 (28)	79 (27)	81 (33)	87 (37)	76 (32)	78 (34)	80 (34)
Northern Cape	79 (26)	76 (25)	73 (26)	77 (30)	66 (28)	72 (30)	74 (31)
Western Cape	86 (41)	83 (39)	82 (42)	82 (44)	80 (44)	82 (45)	81 (43)
National	73 (27)	75 (29)	78 (34)	81 (37)	76 (36)	76 (36)	80 (38)

() Percentage of Bachelor-level passes.

Source: Table extracted from the DBE’s NSC Examination Report 2019 and 2023.

Despite the seemingly steady improvement in overall matric performance over the years, the traditional pass rate does not adequately or holistically reflect the quality of schooling across the country. This is because the overall pass rate does not fully capture important nuances and contextual information for understanding the quality of schooling. For instance, while there has been a steady improvement in the overall matric performance (traditional pass rate) and even bachelor-level passes over the years, the proportion of learners who perform well enough to qualify for university-level further education is still below the 50% mark. Provincial rankings show significant variations, with rural provinces performing comparatively worse.

⁵⁰ OECD. 2016b. *Universal basic skills: What countries stand to gain*. OECD Publishing. <http://dx.doi.org/10.1787/9789264234833-en>
⁵¹ Mullis, I. V. S., von Davier, M., Foy, P., Fishbein, B., Reynolds, K. A., & Wry, E. 2023. *PIRLS 2021 International Results in Reading*. Boston College, TIMSS & PIRLS International Study Center. <https://doi.org/10.6017/irle.tpisc.ir2103.kb5342>
⁵² Mullis, I.V.S., Martin, M.O., Foy, P., Kelly, D.L. & Fishbein, B. 2020. *TIMSS 2019 international results in mathematics and science*. Available from: <https://timssandpirls.bc.edu/timss2019/international-results/>
⁵³ Awich, M. 2021. *The SACMEQ IV international report: A study of the conditions of schooling and the quality of education*. Available from: http://www.sacmeq.org/sites/default/files/sacmeq/reports/sacmeq-iv/international-reports/sacmeq_iv_international_report.pdf

The reality is that performance in the NSC examinations alone says very little about the quality of schooling in South Africa. The throughput rate—defined as the rate at which a cohort successfully completes a qualification within the stipulated time frame for that qualification—gives a more detailed picture of the quality of learning outcomes and the general health of the schooling sector. Trends analysis of the throughput rate—measured as the number of learners who enrol in Grade 2 together and go on to complete matric—in the last five years show that the completion rate of learners has been less than ideal amidst a steady overall performance (see Figure 2). It is only recently, in 2021, that the throughput rate has managed to breach the halfway (50%) mark.

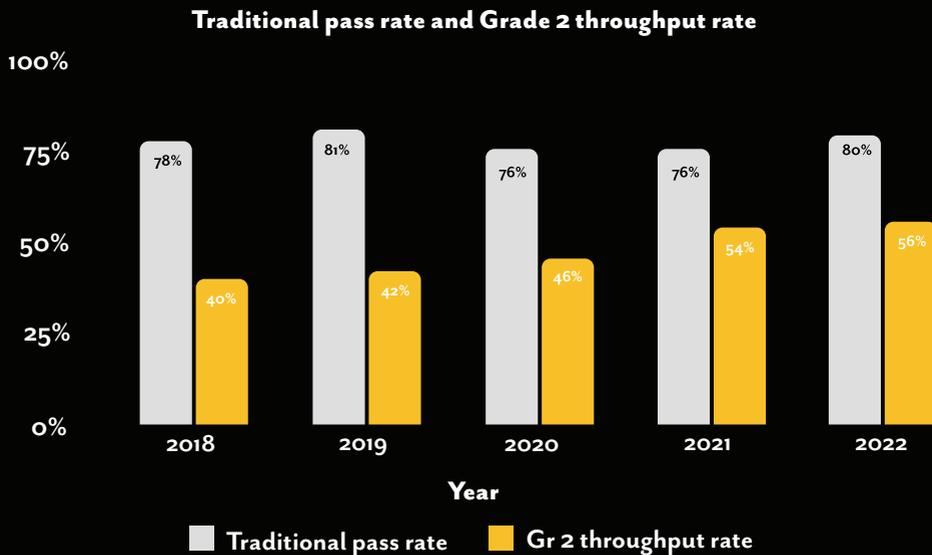


Figure 2: Trends analysis of traditional pass rate vs. throughput rate from 2018 to 2021
Source: Author’s own computation using data extracted from the DBE’s NSC Examination Reports.

While South Africa’s secondary-level school completion rate is not unusual among developing countries, only about half of all learners successfully complete and exit the system after 12 years of schooling. It is worth noting that there are many reasons for the low school completion rate, including grade repetition and school dropout. Whatever the reason, learning outcomes must be considered within the context and conditions in which learning happens. That is to say, school facilities affect learning and academic outcomes in many ways.

Poor infrastructure conditions in South African schools

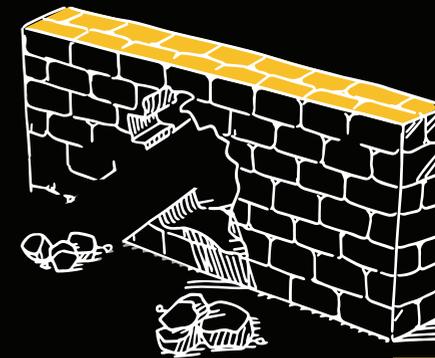
The availability and conditions of school infrastructure can play a critical role in improving schooling quality and outcomes;⁵⁴ the result is that poor or inadequate facilities and basic services have a negative effect on teaching and learning. School facilities may be inadequate in several ways, including dangerous or hazardous buildings, being overcrowded, and lacking basic facilities like safe water and sanitation for hygiene.

The DBE, in its National Policy of an Equitable Provision of an Enabling School Physical Teaching and Learning Environment, has recognised the detrimental effects of inadequate school infrastructure conditions on teaching and learning. As highlighted in the policy, poor physical teaching and learning environments contribute to irregular attendance, higher dropout rates of learners, and higher teacher absenteeism and turnover rates.



Improving education quality and learning outcomes in South African schools will require great effort and extensive investment in school infrastructural development. That is to say, quality school facilities do not just happen. They require careful planning, a lot of funding and coordinated implementation. The subsequent sections explore the current state and conditions of school facilities.

The premise is that infrastructure conditions in many schools in the country fall short of basic standards, infringing on the right to schooling for millions of learners because the physical spaces where education is provided affect the quality of learning as schools are the immediate context within which teaching and learning occur.⁵⁵ The physical spaces where education is provided affect the quality of learning as schools are the immediate context within which teaching and learning occur.⁵⁶



⁵⁴ See Khumalo & Mji, 2014.
⁵⁵ UNESCO Institute for Statistics, 2012. *A place to learn: Lessons from research on learning environments*. Montreal: UNESCO.
⁵⁶ See UNESCO, 2012.



Unsafe physical structures

The Norms and Standards for School Infrastructure law regulates the conditions of physical buildings to ensure all buildings are appropriate and promote the health and safety of learners and teachers. In particular, it requires that all public schools built entirely of inappropriate materials, such as mud, asbestos, metal or wood, be replaced by November 2016. Likewise, one of the primary objectives of the Accelerated School Infrastructure Delivery Initiative (ASIDI) programme was to replace schools built from inappropriate material to contribute toward levels of optimum learning and teaching.⁵⁷

Despite the clear directives in both the Norms and Standards for School Infrastructure and ASIDI, the condition of buildings in many schools is still appalling, in some cases putting the health



and safety of learners at serious risk. For instance, in Equal Education's (EE) 2016 report assessing 60 schools across seven districts in the Eastern Cape province, it was found that the government has failed to comply with the Norms and Standards for School Infrastructure.⁵⁸ Specifically, the findings showed that 46 of the 60 schools visited had at least one inappropriate structure; 13 of the schools were either entirely or substantially inappropriate as they were almost all mud schools, with zinc shacks in some. The findings from the 60 schools are not merely individual cases of the state failing to meet its own target; it is a microcosm of a bigger crisis.

Not much has changed in terms of eradicating schools made of inappropriate materials, even with legally binding commitments to that effect explicitly stated in the Norms and Standards for School Infrastructure. For instance, a virtual presentation by the DBE on the progress made in the eradication of school infrastructure backlogs in April 2023 shows that government is still far from achieving its goal of replacing all schools made of inappropriate materials.

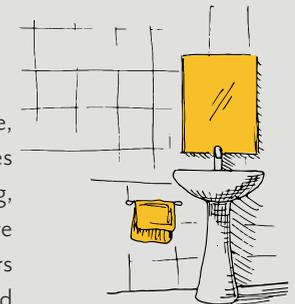


The information presented shows that about 3 677 public schools in the country still had some form of inappropriate structures, with the Eastern Cape (1 538), KwaZulu-Natal (978) and Limpopo (562) together accounting for the bulk (84%) of this critical backlog. Thus, seven years after all schools with inappropriate buildings should have been replaced or upgraded to meet construction safety standards, there is still a significant proportion of schools where all or parts of the physical buildings pose a safety hazard to learners.

Aside from the inappropriateness of the material content of some school buildings, the state of the physical buildings in most schools is often poor and, in some cases, conditions are visibly dangerous. Dilapidated or badly maintained school facilities are a common issue in many schools across the country, particularly in rural and densely populated urban settings like townships. EE's school monitoring observations in the Eastern Cape have consistently found school buildings in deplorable conditions that pose great physical danger to learners and teachers, with documented cases of school buildings with collapsing roofs and floors.

Inadequate water and unsafe sanitation facilities

According to the Norms and Standards for School Infrastructure, all public schools must have sufficient water facilities and supplies available at all times to allow convenient access to water for drinking, personal hygiene and so on. Likewise, all schools are required to have sufficient sanitation facilities that are easily accessible to all learners and teachers, provide privacy and security, promote health and hygiene standards, and are maintained in good working order. More importantly, the Norms and Standards for School Infrastructure banned the presence and use of plain pit toilets in schools when it came into effect in 2013 because of the safety hazards they pose to users.



Even with the clear legal requirements, information gathered from a virtual presentation by the DBE on the progress made in the eradication of school infrastructure backlogs in April 2023 shows that water and sanitation conditions in South African schools are far from the regulatory standards. Concerning water supply, the DBE estimates that over a quarter (6 319) of the 23 246 public schools in the country do not have a reliable water supply or no sustainable water

⁵⁷ The DBE launched ASIDI in 2011 to address the infrastructure backlog in schools without water, sanitation and electricity and to replace schools constructed from inappropriate material like mud, asbestos, zinc and wood.
⁵⁸ Planning to Fail: A report on Equal Education's Eastern Cape school visits. (November 2016) Available at: <https://equaleducation.org.za/wp-content/uploads/2016/07/Full-EE-Planning-to-Fail-Report-2017.pdf>

source, with a substantial number (16 927) of schools requiring additional water storage on site. Schools in mostly rural provinces (Eastern Cape, KwaZulu-Natal and Limpopo) are again overrepresented among schools with water supply backlogs.

Regarding sanitation, the DBE report shows that more than half (13 655) of the country's 23 246 public schools require sanitation upgrades, either new or additional toilets, and that over 143 thousand additional toilets are required to address the current sanitation backlog. Moreover, the 2021 National Education Infrastructure Management System (NEIMS) data,⁵⁹ although outdated, shows that nearly a quarter (5 167) of schools still have plain pit toilets on their premises, with 2 130 schools having to rely on plain pits as their only form of sanitation. Yet again, schools in mostly rural provinces (i.e., Limpopo, Eastern Cape and KwaZulu-Natal) account for the majority of the total pit toilets. It is important to note that because plain pit toilets



have been banned by law, schools that solely rely on this form of sanitation facility are practically deemed to be without sanitation.

Existing public national information on water and sanitation in schools, such as that found in the NEIMS report, is unreliable and conservative at best. Because of the lack of reliable and precise information, the NEIMS merely provides crude provincial statistics and numbers of the infrastructure backlogs without much detail. Given that NEIMS is meant to assist the DBE in monitoring the progress made in provisioning infrastructure to schools and also assist in identifying infrastructure school backlogs, its superficial nature raises concerns. This, coupled with the fact that the information captured on NEIMS is not always a true reflection of

provincial realities, makes it woefully inadequate as a management and monitoring system.

In reality, provincial information on water and sanitation backlogs does not always match national data, be it from NEIMS or the Sanitation Appropriate for Education (SAFE) initiative⁶⁰ statistics. What is more, official provincial information is often inconsistent with learners' lived experiences or school realities.

The data inconsistencies have been well-documented in many of EE's school monitoring reports⁶¹ and external reports by independent bodies such as the South African Human Rights Commission (SAHRC).⁶² Unreliable data not only makes it difficult to identify, plan for and address backlogs but also grossly infringes on the rights of affected learners. This is because compliance with the delivery targets in the Norms and Standards for School Infrastructure requires adequate and reliable information.

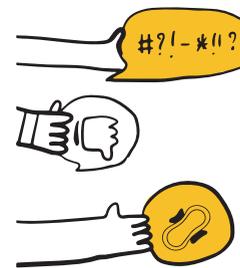
Data reliability issues aside, the current sanitation backlog (even by the conservative NEIMS estimates) also remains a major obstacle in South Africa for future quality schooling for millions of learners. Poor water and sanitation conditions in schools are a serious concern, especially when it is looked at from a gender perspective.

The health and safety risk associated with these vital facilities was laid bare during the COVID-19 pandemic, where it was almost impossible for schools without adequate water and sanitation to follow COVID-19 regulations, which included frequent handwashing. The cholera outbreaks experienced in parts of Gauteng during 2023 also demonstrate the vulnerabilities of school communities with poor water and sanitation infrastructure.



Aside from the environmental and health risks common to all, female learners are mostly affected by the consequences of undignified sanitation. For instance, sanitation issues such as having toilets with no doors, toilets without toilet paper or sanitation bins, having no handwashing facilities inside or near toilets, as well as having to use pit toilets as sanitation bins impact negatively on the management of menstruation in the school environment.

This not only puts the health of female learners at great risk, but it exposes them to physical and social discomfort, embarrassment and vulnerability to bullying. This could, in turn, contribute to their school attendance, retention and academic performance as they try to cope with bullying and other forms of intimidation and embarrassment. This worsens the already existing unequal gender inequality in schooling and the broader society.



⁵⁹ NEIMS is an electronic planning and management tool of the DBE that used to provide public information about the condition of infrastructure and facilities at public schools across the country.
⁶⁰ The SAFE initiative was launched in 2018 by President Ramaphosa to replace plain pit toilets in schools with proper sanitation in accordance with the Norms and Standards for School Infrastructure.
⁶¹ See for example Planning to Fail: A report on Equal Education's Eastern Cape school visits: Dikolo tša go hloka seriti (Schools Without Dignity); Tshedimošo mo dikolong tša go hloka seriti (A review of Schools without Dignity).
⁶² South African Human Rights Commission, July 2021 report on water and sanitation in schools. (September 2021) Available at: <https://www.sahrc.org.za/home/21/files/Water%20And%20Sanitation%20Report%20-%202028%20SeptemberPM.pdf>

Insufficient classroom infrastructure - overcrowding

The Norms and Standards for School Infrastructure clearly set specific minimum physical spaces in a school that must be allocated to each learner and teacher. Additionally, it limits the capacity of the ideal class size to 40 learners. The 1998 admissions policy, which forms part of the National Education Act (1996), limits the learner-teacher ratio of primary schools to 40:1. These guidelines on classroom sizes are intended to ensure manageable class sizes, prevent overcrowding in schools as well as create the right environments for effective teaching and learning processes.

Despite the clear directions in law, many schools in South Africa cannot meet the prescribed basic space requirements and are, therefore, overcrowded. Although overcrowding is complex and varies in conceptualisation, the availability of physical building space and learner distribution in that space are major components of the phenomenon. In this report, overcrowding is narrowly defined to refer to class size and the density of learners in the classroom.



Inadequate classroom infrastructure, i.e., insufficient physical space to accommodate learner numbers, means that schools often have a lot more learners cramped in a space designed to hold fewer numbers. For instance, EE's report investigating the causes and effects of overcrowding in Gauteng schools, using a sample of nine schools in Etwatwa, Ekurhuleni, found serious overcrowding conditions at the schools that were at odds with official statistics from the provincial (Gauteng Department of Education) and the national education department.⁶³

The Gauteng case is one example of the reality in many schools across the country. It speaks to the broader school infrastructure crisis affecting the sector. The DBE's presentation on the

progress made in the eradication of school infrastructure backlogs in April 2023 confirms as much. In that report, it was revealed that over a third (8 265) of schools across the country require additional classrooms and that 71 677 additional classrooms are required to address overcrowding conditions across the country.

The overcrowding issue is both a consequence and determinant of insufficient schools and classrooms, with serious implications for other infrastructure deficiencies and teaching and learning outcomes. It has a negative impact on the availability and conditions of school resources such as furniture, and sanitation facilities. For example, having too many learners can contribute to insufficient furniture as chairs and desks are often limited to the number of learners the space was intended to hold. There is also a strong likelihood of existing school furniture being worn out faster from frequent overuse. Further, more learners not only put a strain on the physical space, requiring more classrooms; it also puts a strain on other existing school facilities like toilets.

More importantly, overcrowded schools have serious consequences for teaching and learning, including poor classroom management and teachers' inability to give enough attention to each learner. Several studies have shown that overcrowded classrooms and high learner-teacher ratios negatively impact the quality of schooling and ultimately learners' academic performance.⁶⁴ Specifically, overcrowded classrooms contribute to poor learning conditions and decrease learning because of disruptions and high noise levels that could reduce learners' attention and focus on what is being taught.⁶⁵

The above discussions show that national and provincial education departments have failed to meet their own basic infrastructure goals and are far from achieving many of the stated objectives under the Norms and Standards for School Infrastructure. Unsafe school buildings, inadequate water and sanitation facilities and insufficient physical space are but a few examples of the government's legal and moral failings to learners and school communities. Related to this, the lack of facilities and services essential to learning such as a library, laboratory or even electricity not only negatively affects teaching and learning but hampers the realisation of quality schooling.⁶⁶

⁶³ See No space for us: Understanding overcrowding in Gauteng schools.

⁶⁴ OECD. 2011. *Education at a glance: What is the student-teacher ratio and how big are classes?* <https://www.oecd.org/edu/skills-beyond-school/48631144.pdf>. See also Khumalo & Mji, 2014; West & Meier, 2020.

⁶⁵ See for example Marias 2016; Ndebele, 2014)

⁶⁶ The current power crisis at ESKOM means that schools in the country, particularly in under-resourced ones, have unreliable supply of electricity due to load shedding, with profound consequences for teaching and learning.

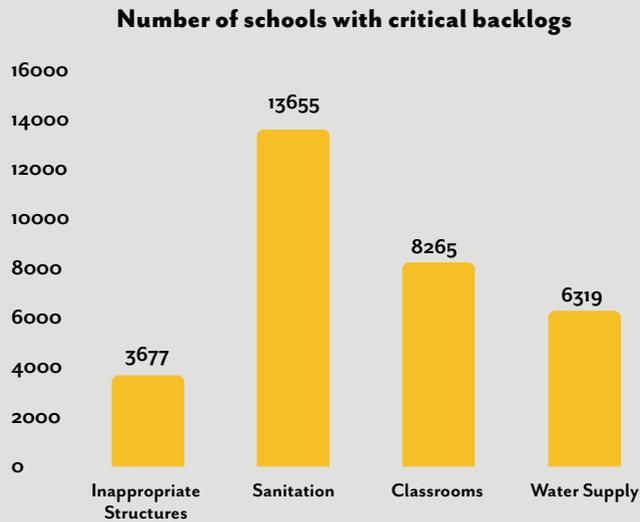


Figure 3: Summary of national critical backlogs in public schools, 2023
Source: Author's own computation using data extracted from the DBE's April 2023 presentation.

In summary, the infrastructure conditions in many schools in South Africa (as shown in **Figure 3 above**) are unlawful, to say the least. The poor physical conditions of the learning environments some learners contend with to get a decent education are proof of the extent of the government's failure to meet its own binding basic infrastructure goals. This failure on the part of the government poses a great barrier to the enjoyment of the right to quality schooling, particularly for learners attending poorer schools with disproportionately greater infrastructure backlogs.

Declining funding or investment in infrastructure

Evidence, mostly from the global north, has shown that investments in quality school infrastructure are strongly associated with improved learning outcomes.⁶⁷ Since school facilities are not cheap, substantial financial resources are needed to provide or improve the quality of school facilities. Given the extent of infrastructure backlogs in South African schools, one would expect the government's financial response to match the infrastructure

need. Unfortunately, this is not always the case as budget allocation trends show. In light of the relationship between government funding and quality schooling, it is perhaps unsurprising that South Africa has dual learning and infrastructure crises.

Comparatively, spending on schooling (the national basic education budget) constitutes a significant proportion of government expenditure in South Africa. However, the way schools are funded is rather complex and does not always reflect this high portion of the national amount allocated for basic education. Nonetheless, the total basic education budget allocated by the National Treasury is meant to cover national expenditure by the DBE, conditional grants and provinces' main education budgets (through the provincial equitable share).



Since provinces bear the primary responsibility for schools within their geographical control, provincial treasuries determine the percentage of their equitable share and self-raised revenue that will be allocated to schooling within their provinces. In the context of school infrastructure, two key conditional grants—the Education Infrastructure Grant (EIG) and the School Infrastructure Backlog Grant (SIBG)—are available to provincial education departments for the purpose of addressing school infrastructure backlogs.

Generally, there has been a shift in spending priorities over the years, with National Treasury adopting austerity budgeting or cuts to public social spending, underinvesting in key social and economic sectors, to the detriment of the poor. This can be seen in the portion of Treasury's total budget given towards schooling, which has been decreasing over the years, showing a decline in government's prioritisation of investment in the sector.

The decreased investment in the sector, per the national budget, was accelerated by the COVID-19 pandemic, a time during which schooling experienced further cuts. The pandemic forced the National Treasury to revise its 2020/2021 budget and take the exceptional step of tabling a Supplementary Budget in June 2020. The 2020 Supplementary Budget made major changes to departmental funding as government not only had to fund COVID-19 relief measures but also had to determine which departments to prioritise (and deprioritise) in this unique environment.

⁶⁷ Filardo, M. 2008. *Good buildings, better schools: An economic stimulus opportunity with long-term benefits*. Washington, D.C.: Economic Policy Institute; UNICEF, 2020.

In that regard, the schooling sector was considered a donor department; received no additional support to help with COVID-related costs but instead experienced several funding cuts. This then forced both the national and provincial education departments and schools to reallocate their already overstretched budgets to cover unexpected COVID-related expenses. This meant that schools were unable to get much-needed maintenance and upgrades to dilapidated or dangerous infrastructure.

The shift in government’s spending priorities over the years has been equally felt at the programme level, especially in relation to school infrastructure. This is despite National Treasury placing renewed priority on school infrastructure through the introduction of the EIG and the SIBG. For instance, the SIBG—aimed at eliminating backlogs in inappropriate school structures and addressing school access to basic services over three years⁶⁸—has experienced erratic funding levels and a decline in real allocation over the last four years (see Table 2 below).

Table 2. Real and nominal conditional grant allocations from 2018/19 to 2022/23

	SIBG					EIG				
	2018/19	2019/20	2020/21 June Budget	2021/22	2022/23	2018/19	2019/20	2020/21	2021/22	2022/23
Appropriation (nominal) (R in millions)	2 273	2 027	1 929	2 003	2 038	10 094	10 514	9 415	11 689	12 384
CPI Index (Yearly Average)	0.85	0.88	0.91	0.96	1	0.85	0.88	0.91	0.96	1
Appropriation (real) (R in millions)	2677	2291	2119	2093	2038	11 889	11 886	10 340	12 215	12 384
Annual % change (real)	21%	-14.41%	-7.54%	-1.20%	-2.63%	-7.85%	-0.03%	-13%	18.13%	1.38%

Source: National Treasury, Budget Review, Equal Education’s own analysis

⁶⁸ Abdoll, C. & Barberton, C. (eds.) 2014. *Mud to bricks: A review of school infrastructure spending and delivery*. Centre for Human Rights, University of Pretoria: Pretoria University Law Press (PULP).

In the 2020/2021 February budget, the SIBG was allocated R1.7 billion for the financial year,⁶⁹ a significant decrease from previous allocations. However, in response to the pandemic, the SIBG received an additional R600 million in the 2020 Supplementary Budget. These funds were taken from the EIG to provide schools with temporary water and sanitation facilities. A total of R60 million was also cut from the SIBG grant, resulting in a final figure of approximately R2.3 billion (see Table 3 below).

Similarly, the EIG—introduced in 2011 to provide additional funding to provinces to help accelerate construction, maintenance, upgrading, and rehabilitation of new and existing infrastructure in education⁷⁰—has not had consistent funding. For instance, in the 2020/21 financial year, R11 billion was originally allocated to the EIG in the February budget but the 2020 Supplementary Budget cut R2.2 billion from the grant, with a further R4.4 billion reprioritised within the EIG to cover COVID-related costs.

Table 3. Changes to 2020/21 school infrastructure grant allocations

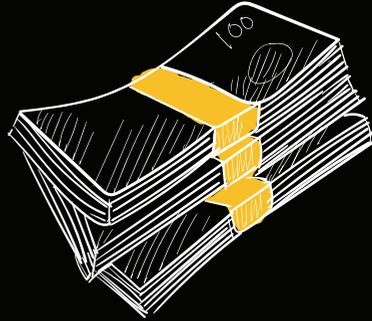
Grant (R’000)	Main Appropriation 2020/2021	Additional Funds	Funds cut	Net change	New Appropriation
EIG	11 007 967			-2 221 000	8 786 967
SIBG	1 736 413	608 000	367 688 ⁰	540 000	2 330 413
Total infrastructure funding	12 744 380	600 000	-2 281 000	-1 681 000	11 063 380

Source: Taken from A. Cele, “Budget Education Brief 2020”, Public Service Accountability Monitor, 2020

⁶⁹ National Treasury, 2020. *Division of Revenue Amendment Bill*. Available from: [http://www.treasury.gov.za/legislation/bills/2020/%5BB09-2020%5D%20\(Division%20of%20Revenue%20Amendment%20Bill\).pdf](http://www.treasury.gov.za/legislation/bills/2020/%5BB09-2020%5D%20(Division%20of%20Revenue%20Amendment%20Bill).pdf)

⁷⁰ Abdoll & Barberton, 2014.

The reprioritisation and reduction of these funds were considered one of the biggest cuts to grants across all sectors and left only R4.3 billion for planned school infrastructure projects. The EIG budget cuts resulted in the cancellation, delay or suspension of several important school infrastructure projects. For example, according to the DBE's report to Parliament's Appropriations Committee on 22 July 2020, budget cuts experienced in the 2020/21 financial year meant that 168 new and replacement projects, 388 upgrade and addition projects, 269 rehabilitation and refurbishment, 400 repairs and renovation, and 711 maintenance projects were in some form affected.



The declining investment in the sector broadly, and in school infrastructure specifically, not only affect the ability of education departments to address infrastructure demands to meet the targets set in the Norms and Standards for School Infrastructure but it indirectly infringes on learners' rights to safe structures, sanitation and water, among others.

Indeed, a lot of money is required to adequately address the crisis in infrastructure provisioning in schools across the country. In a presentation on the progress made in the eradication of school infrastructure backlogs in April 2023, the DBE estimated that it cost a staggering R73.6 billion to address all existing school infrastructure backlogs. The amount of money required to bring most schools in line with the basic infrastructural standards is great. Even if the sector did not have poor spending problems and education departments spent their budgets carefully and on the right things, there still would not be enough money to address the backlogs in the short term because the conditional grants ringfenced for such projects rarely keep up with inflation.

RELATIONSHIP BETWEEN SCHOOL INFRASTRUCTURE CONDITIONS AND TEACHING AND LEARNING OUTCOMES IN SOUTH AFRICA:

AN EMPIRICAL ANALYSIS

Conceptual framework and data

The quantitative part of the report builds on the idea that the conditions of school facilities affect the right to quality education as school infrastructure can either restrict or support better teaching and learning. The analysis uses schooling-related information taken from the 2019 South African General Household Survey (GHS).⁷¹ Stats SA conducted the 2019 survey between January and December 2019,⁷² using the 2013 Master Sample, which is representative at national and provincial levels.⁷³

A total of 19,649 households (including multiple households) were successfully interviewed, with a total of 71,137 individuals responding to the 2019 GHS. For this report, responses were limited to people who were still attending a public school, were not older than 21 years and had not yet completed grade 12 (matric). So, the final sample used for the analyses was 13 877 individual respondents.

Measures and statistical analysis

The analyses used an environmental framework to assess determinants of teaching and learning processes. The main predictor variables of interest were school infrastructure conditions. It was measured using two proxy indicators—classes too large/too many learners (characterised as overcrowding) and facilities in bad condition (characterised as poor physical infrastructure).

⁷¹ The GHS is a household-based survey developed by Statistics South Africa (Stats SA) in 2002 to track the progress of development in the country every year. The survey covers six broad areas, namely education, health and social development, housing, households' access to services and facilities, food security, and agriculture. The 2019 dataset was used because it was the latest available survey before COVID-19, as we wanted to control for any effects of the pandemic.

⁷² The dataset is publicly available in the online DataFirst repository, <https://doi.org/10.25828/6byj-n342>. Permission from DataFirst is required to access the data. All ethical considerations were met by the primary investigators, Statistics South Africa. Consent of study subjects can be reasonably presumed once permission was obtained to use the data.

⁷³ A two-stage sampling technique was used in the Master Sample in selecting respondents. First, a stratified design with probability proportional to size sampling (PPS) was employed in selecting 3 324 primary sampling units (PSUs) from 103 576 enumeration areas. Secondly, systematic sampling was employed to select approximately 33,000 dwelling units in the second stage. For more details, see <http://www.statssa.gov.za/publications/P0318/P03182019.pdf>



The outcome variables of interest related to teaching and learning outcomes were measured using five indicators, three relating to learning outcomes (literacy, grade repetition and learner attendance) and two teaching outcomes (teacher attendance and quality of teaching). The control variables included basic demographic variables of age, biological gender or sex, race and province of residence, chosen for their theoretical importance.

Statistical analyses were conducted at three levels, namely, univariate, bivariate and multivariate. At the univariate level, the distribution of the sociodemographic characteristics of the respondents is shown using descriptive statistics such as frequencies and percentages. At the bivariate level, the Pearson Chi-square test was used to measure the association between the infrastructure conditions and teaching and learning outcomes, using a p-value < 0.05 as the criterion for significance. At the multivariate level of the analysis, a multinomial logistic regression technique was employed using explanatory variables significant at the bivariate level to predict the likelihood of poor teaching and learning outcomes. The results are interpreted using Odds Ratio (OR), with the level of significance (p-value) set at p < 0.05 and confidence intervals of 95%. All data was analysed using version 25 of the Statistical Package for Social Sciences (SPSS).

Results of analyses

The findings of the statistical analyses are grouped and discussed as follows: background characteristics (univariate results), patterns in teaching and learning outcomes in South Africa (bivariate results), and the effects of infrastructure conditions on teaching and learning (multivariate results).

Respondents' background characteristics

In the univariate analysis, the distributions of the background characteristics of the study population as well as the percentage of reported infrastructure conditions in South Africa are presented in Table 4. Out of the 13 877 individuals, 50.3% were male; 49.7% were females. The mean age of the sampled respondents was 12.05 years. The majority (89.1%) of respondents identified as black African; Indians/Asians constituted the smallest population group with 0.9%. Comparatively, more respondents lived in KwaZulu-Natal (19.8%), Eastern Cape (16.2%), Gauteng (16.1%) and Limpopo (14%) provinces respectively.

Table 4. Percentage distribution of school-going respondents aged 20 years or younger by selected demographic characteristics, 2019 GHS

Characteristics	Frequency	Percentage
Age—mean/sd	12.1	3.87
Sex		
Male	6977	50.3
Female	6900	49.7
Race		
Black African	12369	89.1
White	289	2.1
Coloured	1097	7.9
Indian/Asian	122	0.9
Province		
Western Cape	1047	7.5
Eastern Cape	2253	16.2
Northern Cape	640	4.6
Free State	888	6.4
KwaZulu-Natal	2742	19.8
North West	833	6.0
Gauteng	2235	16.1
Mpumalanga	1300	9.4
Limpopo	1939	14.0
Total	13877	100.0

Source: Author's own computation using data from 2019 GHS.

Patterns in teaching and learning outcomes in South Africa

The results of the Chi-squared tests showing the prevalence of reported poor teaching and learning trends by the respondents' background characteristics are presented in Tables 5 and 6 below. For learning, the Chi-squared results revealed a statistically significant relationship between literacy and all the selected explanatory variables; grade repetition statistically correlated with all explanatory variables except classroom infrastructure, while learner attendance significantly correlated with age, race, province and classroom infrastructure.

Generally, nearly a fifth (18.7%) of respondents reported being illiterate, with males (52.6%), black Africans (91.3%), and those living in Eastern Cape (19.8%) and KwaZulu-Natal (19.1%) the majority of the reported illiterate respondents. A small but significant proportion (9.2%) of respondents reported having repeated a grade, with black Africans (92.5%), males (58.5%) and those residing in Limpopo (20.3%) more frequently reporting grade repetition. Lastly, 5.5% of respondents reported having been absent from school; black Africans (85.9%) and those living in Gauteng (19.5%) more frequently reported being absent from school.

Table 5. Bivariate association of demographic characteristics and infrastructure conditions with learning outcome

Predictor variables	Literacy			Grade retention			Attendance		
	Number	% Illiterate	p value	Number	% Repeat	p value	Number	% Absent	p value
Age – mean/sd	7.9	2.01	<.001	14.4	3.87	<.001	12.5	4.02	0.002
Race			<.001			<.001			0.002
Black African	2369	91.3		1177	92.5		660	85.9	
White	25	1.0		9	0.7		12	1.6	
Coloured	184	7.1		87	6.8		87	11.3	
Indian/Asian	17	0.7		0	0.0		9	1.2	
Sex			0.008			<.001			0.816
Male	1366	52.6		745	58.5		383	49.9	
Female	1229	47.4		528	41.5		385	50.1	
Province			<.001			<.001			<.001
Western Cape	172	6.6		79	6.2		70	9.1	
Eastern Cape	513	19.8		170	13.4		104	13.5	
Northern Cape	132	5.1		66	5.2		75	9.8	
Free State	126	4.9		107	8.4		35	4.8	
KwaZulu-Natal	496	19.1		197	15.5		127	16.5	
North West	226	8.7		97	7.6		81	10.5	
Gauteng	391	15.1		187	14.7		150	19.5	
Mpumalanga	208	8.0		112	8.8		80	10.4	
Limpopo	331	12.8		258	20.3		46	6.0	
Facilities bad			0.003			0.042			0.306
Yes	30	1.2		33	2.6		18	2.3	
No	2565	98.8		1240	97.4		750	97.7	
Classes too large			0.018			0.096			<.001
Yes	58	2.2		47	3.7		39	5.1	
No	2537	97.8		1226	96.3		729	94.9	
Total	2595	18.7		1273	9.2		768	5.5	

Source: Author's own computation using data from 2019 GHS.

Regarding teaching, both the quality of teaching and teacher attendance significantly correlated with all explanatory variables except age and sex. Disaggregated analysis shows that poor quality of teaching was more frequently reported by Black Africans (76.4%), females (55.7%) and those living in Gauteng (22.9%) and Western Cape (19.3%). Finally, black Africans (85.8%), females (57.5%) and those residing in Gauteng (26%) more frequently reported a teacher often being absent from school.

Table 6. Bivariate association of demographic characteristics and infrastructure condition with teaching outcome

Predictor variables	Quality of teaching			Attendance		
	Number	%	Poor quality	p value	% Often absent	p value
Age – mean/sd	12.4		3.89	0.253	3.88	0.932
Race				<.001	0	.007
Black African	107	7	6.4		85.8	
White	12		8.6		6.3	
Coloured	19		13.6		6.3	
Indian/Asian	2		1.4		1.6	
Sex				0.154	0	.079
Male	62		44.3		42.5	
Female	78		55.7		57.5	
Province				<.001	<	.001
Western Cape	27	1	9.3		12.6	
Eastern Cape	10		7.1		15.0	
Northern Cape	8		5.7		5.5	
Free State	6		4.3		3.9	
KwaZulu-Natal	21	1	5.0		15.7	
North West	10		7.1		11.0	
Gauteng	32		22.9		26.0	
Mpumalanga	19	1	3.6		3.9	
Limpopo	7		5.0		6.3	
Facilities bad				<.001	<	.001
Yes	71	5	0.7		55.1	
No	69		49.3		44.9	
Classes too large				<.001	<	.001
Yes	77	5	5.0		59.8	
No	3		45.0		40.2	
Total	140		1.0		0.9	

Source: Author's own computation using data from 2019 GHS.

Effects of infrastructure conditions and control variables on teaching and learning

The regression results showed that respondents' age, sex, race, province of residence, and classroom infrastructure were significant predictors of learning outcomes among individuals aged 20 years and younger in South Africa (see Table 7). Likewise, race, province of residence, quality of facilities and classroom infrastructure emerged as significant predictors of teaching outcomes in South Africa (see Table 8).



Specifically, bivariate results showed that all selected explanatory variables were significantly associated with literacy in South Africa. However, in the multivariate model, the relationship between literacy and infrastructure variables lost significance. Nonetheless, age significantly predicted literacy as respondents aged 20 years and younger (OR=0.54 CI=0.52–0.55) were less likely to be illiterate. Moreover, males (OR=1.16, CI=1.04–1.29) were more likely to be illiterate compared to females.

Similarly, compared to their white counterparts, black Africans (OR=3.82, CI=2.39–6.09) and coloureds (OR=2.62, CI=1.58–4.33) had higher odds of being illiterate, whilst Indians/Asians (OR=0.03, CI=1.08–4.92) were less likely to be illiterate. Respondents who resided in North West (OR=3.17, CI=2.46–4.08), Northern Cape (OR=2.19, CI=1.61–2.96), Eastern Cape (OR=1.90, CI=1.56–2.31), Western Cape (OR=1.35, CI=1.02–1.78) and KwaZulu-Natal (OR=1.31, CI=1.08–1.59) provinces were significantly more likely to be illiterate compared to those in Limpopo.

Regarding grade retention, respondents aged 20 years and younger (OR=1.19, CI=1.17–1.21) were more likely to repeat a grade. Males (OR=1.45, CI=1.28–1.63) were at a greater risk of repeating a grade compared to females. Compared to white people, black Africans (OR=3.08, CI=1.57–6.06) and coloured people (OR=2.73, CI=1.34–5.56) were at a greater risk of repeating a grade. Interestingly, province of residence was protective of grade retention, with those residing in KwaZulu-Natal (OR=0.51, CI=0.42–0.63), Eastern Cape (OR=0.55, CI=0.44–0.68), Mpumalanga (OR=0.61, CI=0.48–0.77), Gauteng (OR=0.65, CI=0.53–0.79) and Western Cape (OR=0.63, CI=0.47–0.86) significantly less likely to repeat a grade compared to those in Limpopo. Surprisingly, at the bivariate level, the quality of facilities correlated significantly with grade retention; however, in the multivariate model, the relationship was not significant, although bad/poor facilities posed a greater risk of repeating a grade.

For school attendance, respondents aged 20 years and younger are at risk of absenteeism. At the bivariate level, race correlated significantly with absenteeism but in the multivariate model, the relationship was not significant; although all population groups were at risk of absenteeism compared to white people. Compared to Limpopo, respondents who resided in all other provinces had a greater risk of skipping school, with the risk higher for those in the Northern Cape (OR=5.41, CI=3.63–8.07) and North West (OR=4.34, CI=2.99–6.30) provinces. Lastly, those who reported crowded classroom conditions (OR=1.69, CI=1.20–2.38) were significantly more likely to skip school.

In terms of teaching outcomes, black Africans (OR=0.32, CI=0.14–0.76) and coloured people (OR=0.37, CI=0.14–0.99) were significantly less likely to report poor quality of teaching compared to their white counterparts. Compared with those living in Limpopo, respondents who resided in Northern Cape (OR=4.09, CI=1.29–12.95), Gauteng (OR=3.49, CI=1.43–8.51) and Mpumalanga (OR=2.87, CI=1.11–7.40) were significantly more likely to report/experience poor quality of teaching. Similarly, those who reported bad facilities (OR=19.41, CI=12.04–31.29) and overcrowded classroom conditions (OR=13.59, CI=8.49–21.78) were significantly more likely to experience/report poor quality of teaching.

Compared with white people, coloured people (OR=0.24, CI=0.07–0.87) were significantly less likely to report/experience teacher absenteeism. Those who resided in Northern Cape (OR=4.98, CI=1.49–16.60), Gauteng (OR=3.57, CI=1.47–8.66) and Eastern Cape (OR=2.86, CI=1.12–7.29) were significantly more likely to report/experience teacher absenteeism compared to those in Limpopo. Those who reported bad facilities (OR=23.09, CI=13.96–37.93) and overcrowded classroom conditions (OR=21.24, CI=12.84–35.13) were significantly more likely to report teacher absenteeism.

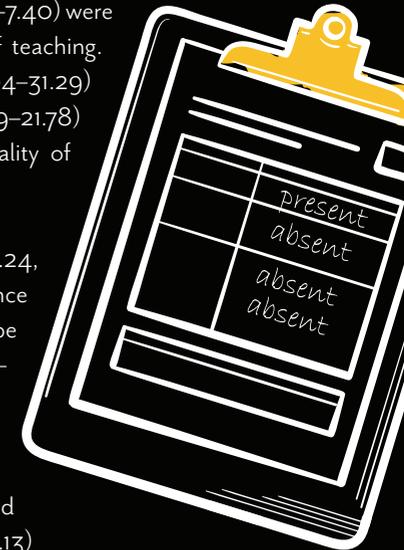


Table 7. Multivariate model using multinomial logistic regression technique predicting learning outcomes among respondents 20 years and younger in South Africa

Independent variables	Illiteracy		Grade retention		Absenteeism	
	Odds Ratio	CI	Odds Ratio	CI	Odds Ratio	CI
Age	0.54***	0.52 - 0.55	1.19***	1.17 - 1.21	1.03**	1.01 - 1.05
Sex						
Male	1.16**	1.04 - 1.29	1.45***	1.28 - 1.63		
Female	1.00		1.00			
Race						
Black African	3.82***	2.39 - 6.09	3.08**	1.57 - 6.06	1.57	0.87 - 2.83
White	1.00		1.00		1.00	
Coloured	2.62***	1.58 - 4.33	2.73**	1.34 - 5.56	1.66	0.89 - 3.12
Indian/Asian	0.03*	1.08 - 4.92			2.21	0.89 - 5.45
Province						
Western Cape	1.35*	1.02 - 1.78	0.63**	0.47 - 0.86	2.88***	1.91 - 4.36
Eastern Cape	1.90***	1.56 - 2.31	0.55***	0.44 - 0.68	2.02***	1.42 - 2.87
Northern Cape	2.19***	1.61 - 2.96	0.81	0.59 - 1.10	5.41***	3.63 - 8.07
Free State	0.81	0.62 - 1.06	0.96	0.75 - 1.23	1.72*	1.10 - 2.68
KwaZulu-Natal	1.31**	1.08 - 1.59	0.51***	0.42 - 0.63	1.97***	1.40 - 2.78
North West	3.17***	2.46 - 4.08	0.86	0.67 - 1.11	4.34***	2.99 - 6.30
Gauteng	1.21	0.99 - 1.48	0.65***	0.53 - 0.79	2.98***	2.13 - 4.18
Mpumalanga	1.11	0.88 - 1.41	0.61***	0.48 - 0.77	2.67***	1.84 - 3.86
Limpopo	1.00		1.00		1.00	
Facilities bad						
Yes	0.79	0.48 - 1.30	1.34	0.92 - 1.96		
No	1.00		1.00			
Classes too big						
Yes	0.98	0.67 - 1.44			1.69**	1.20 - 2.38
No	1.00				1.00	

* Significant at 0.05 level, ** Significant at 0.01 level, *** Significant at 0.001 level and 1.00 is the reference category.

Table 8. Multivariate model using multinomial logistic regression technique predicting teaching outcomes among respondents 20 years and younger in South Africa

Independent variables	Poor teaching quality		Absenteeism	
	Odds Ratio	CI	Odds Ratio	CI
Race				
Black African	0.32*	0.14 - 0.76	0.69	0.23 - 2.10
White	1.00		1.00	
Coloured	0.37*	0.14 - 0.99	0.24*	0.07 - 0.87
Indian/Asian	0.55	0.08 - 3.59	1.21	0.15 - 9.74
Province				
Western Cape	2.60	0.90 - 7.53	1.69	0.52 - 5.50
Eastern Cape	1.33	0.48 - 3.75	2.86*	1.12 - 7.29
Northern Cape	4.09*	1.29 - 12.95	4.98**	1.49 - 16.60
Free State	1.66	0.51 - 5.59	1.24	0.35 - 4.37
KwaZulu-Natal	1.48	0.58 - 3.75	1.09	0.43 - 2.81
North West	1.80	0.62 - 5.23	2.34	0.85 - 6.48
Gauteng	3.49**	1.43 - 8.51	3.57**	1.47 - 8.66
Mpumalanga	2.87*	1.11 - 7.40	0.39	0.11 - 1.36
Limpopo	1.00		1.00	
Facilities bad				
Yes	19.41***	12.04 - 31.29	23.09***	13.96 - 37.93
No	1.00		1.00	
Classes too big				
Yes	13.59***	8.49 - 21.78	21.24***	12.84 - 35.13
No	1.00		1.00	

* Significant at 0.05 level, ** Significant at 0.01 level, *** Significant at 0.001 level and 1.00 is the reference category.

DISCUSSION AND CONCLUSION

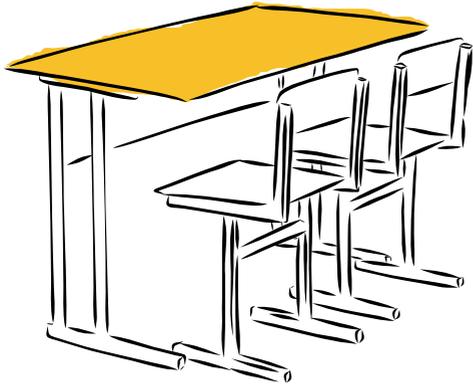
The South African schooling sector still faces inherent challenges despite great efforts by the post-apartheid government to transform and expand schooling. First, the sector is still plagued by substantial historical infrastructure backlogs that continue to shape the schooling experiences of many learners. Second, learning outcomes in the majority of the country's schools remain low despite important pedagogical interventions. Together, these two issues have contributed to a learning crisis that disproportionately affects children from vulnerable and marginalised households and communities.



The current state of the schooling sector, as alluded to above, not only infringes on some learners' constitutional right to basic schooling; it threatens the achievement of the SDG4 target of "free, equitable and quality primary and secondary education for all girls and boys leading to relevant and effective learning outcomes by 2030". Despite the constitutional and human rights imperatives to improve schooling outcomes in the country, international, regional and national assessments demonstrate that children in South Africa are not even sufficiently competent in basic skills like literacy or numeracy.

Ofentimes, understanding the root causes of the learning crisis is limited to questions of curricular competencies and teaching resources and approaches. Undoubtedly these questions are important but equally so are questions about school environment exposures

that produce or hinder desired outcomes. A review of the empirical literature shows that the physical conditions of schools, including classroom size, impact schooling outcomes, although the impact varies widely across contexts. Thus, this report sought to examine the relationship between infrastructure and teaching and learning using a nationally representative sample of individuals aged 20 years and younger drawn from the 2019 General Household Survey.



The results of the statistical analyses broadly corroborated important assertions about the contributors of school outcomes whilst revealing context-specific information about what shapes these outcomes. Concerning the factors contributing to learning outcomes in the country, it became clear that individuals' age, sex and race play a major role in shaping school participation, engagement and eventual performance/learning more so than environmental factors.

As far as environmental factors are concerned, the locale (measured as the province of residence) influences learning outcomes more directly than the conditions of the immediate school environment, although in varying degrees. Although there may be province-specific dynamics at play that the analyses could not fully capture, evidently the school-level conditions are not as impactful as the broader structural context in which the school is situated.

However, poor classroom infrastructure or overcrowding (measured as too many learners for the physical size of the classroom) emerged as an important school-level factor with a negative impact on learners' school attendance. Specifically, the results showed that overcrowded conditions increase the odds of learners being absent from school. This finding is especially concerning because learners missing school has far-reaching consequences, including the likelihood of learners falling behind or failing (poor academic performance) and ultimately leaving school before completing (drop-out).

Whilst the results showed that learning outcomes are largely explained by individuals' socio-demographic factors such as age, sex and race, teaching outcomes tended to be greatly shaped by environmental factors. The analyses revealed that teacher attendance (an important indicator of teacher behaviour and motivation) is greatly shaped by the condition or state of the school environment. Specifically, poor facilities and classroom infrastructure negatively affect teachers' skills/performance and motivation to work.

Arguably, the conditions of the school environment indirectly shape learning outcomes for one important reason, teachers remain key to learners' schooling and learning seeing as teacher skills and motivation are directly linked to learning.⁷⁴

⁷⁴See World Bank, 2018.

This suggests that whatever affects teachers' motivation, skills and approaches will eventually affect learners' learning and achievements. It therefore follows that investments in improving school infrastructure serve two purposes in tackling the learning crises in the country.

In summary, the findings show that the physical conditions of schools do impact learning outcomes but not in a linear fashion as expected. School conditions in the South African context seemingly play a dual function. Firstly, infrastructure conditions directly impact teachers' attendance and teaching quality. Secondly, given that teachers play a key role in learning, school conditions indirectly impact learners' schooling experience and outcome.

POLICY IMPLICATIONS AND LIMITATIONS

Given the extent of the country's learning (quality) crisis, the findings of this report will be useful for policy reform beyond standard pedagogical interventions. The findings provide information on school-level factors that shape teaching and learning in South Africa, proving useful for progressive educational policy reforms. In this respect, the following policy considerations are recommended:



1. Education departments must urgently fulfil their legal obligations in terms of the Norms and Standards for School Infrastructure and eradicate infrastructure backlogs to ensure all schools can deliver quality schooling for learners;
2. National Treasury must prioritise and provide progressive infrastructure funding, as well as ensure efficient spending by education departments, implementing agents and contractors involved in infrastructure provisioning to schools;
3. The DBE must develop Binding School Capacity Norms to ensure an ideal distribution of learners across schools to avoid overcrowding conditions; and
4. Provincial education departments must develop a forward-looking infrastructure plan that puts an end to current overcrowding and prevents future overcrowding.

Although the results of the statistical analyses are largely consistent with earlier findings linking infrastructure to teaching and learning, the report is not without limitations. Firstly, and perhaps more importantly, the present findings suggest that understanding the determinants of schooling outcomes is conceptually and empirically difficult as there is no simple or single way of estimating the impact of individual, socioeconomic and school-level factors on outcomes. Therefore, more rigorous research is needed to understand the link between school infrastructure and quality teaching and learning outcomes.

In addition, the results of the statistical findings in this report should be interpreted with caution. Although the analyses used a nationally representative dataset that allows for the generalisation of findings to the larger population, the data is still cross-sectional, so the results can only be interpreted as associations and not causal relationships.



E EQUAL
EDUCATION