

# Resource Provisioning and Implications on Learner Performance in Schools in Limpopo Province, South Africa

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## Abstract

This study investigates the relationship between resource provisioning and learners' performance in public schools in Limpopo province, South Africa. The education production function theory was used to address a set of policy questions such as: how much will outcomes improve if resources are increased by some amount? Or can schools deliver better outcomes with existing resources? Or will better outcomes require more resources-efficiency? This quantitative study used a survey of four validated questionnaires distributed to 272 representatives from the school principals, heads of departments, teachers, and school governing bodies. The sample was drawn from 68 public secondary schools from different quintiles (1 to 5) in Limpopo province using a probability stratified and purposive random sampling technique. Descriptive and Pearson correlation statistics were used in data analysis. The findings indicate that resource provision was shown to be to the determinant of learners' performance in public schools. Specifically, the findings indicated that the way in which school resources are allocated, distributed, and utilised have an influence on learners' performance. As a result, the study recommends that a review of resource provision is a factor that the Department of Basic Education, including stakeholders, should pay more attention to in order to improve learners' performance in public schools.

**Keywords:** resources; allocation; distribution; utilisation; performance; schools; South Africa

## Introduction

There is a growing body of research that indicates that resources to schools matter a great deal as they influence teaching and learning opportunities. Research in education by many authors, especially in developed countries and to a lesser extent in developing nations, has closely looked at resourcing of schools (Coleman 1966; Hanushek 1986, 2006; Hendriks 2008; Lemon 2004; Motala 2006). In various ways and to varying degrees, studies make the point that resources to schools have an impact on teaching and learning, and governments across the globe should pay particular attention to this issue (Case and Deaton 1999; Coleman and Anderson 2000; Levačić 2014). Research indicates that the resourcing of schools in developing countries, such as South Africa, is characterised by huge disparities and that attempts should be made to equalise resource provision (Hendriks 2008; Lemon 2004; Motala 2006; Sedibe 2011; van der Berg 2008). Research has also shown some differences in the way in which school resources are allocated, distributed, and utilised in public schools. Therefore, there is a need to focus on resource provisioning and its implications for learners' achievement in South Africa (van der Berg 2008).

According to van der Berg (2008), schools that were historically for white and Indian learners still outperform those for black and coloured learners in examinations. Intraclass correlation coefficients ( $\rho$ ) reflect far greater between-school variance compared to overall variance than for other countries. It is posited that Southern and East African Consortium for Monitoring Educational Quality's (SACMEQ) rich datasets provide new possibilities for investigating relationships between educational outcomes, socioeconomic status, learner and teacher characteristics, school resources, and school processes. In modern times, the provision of education has improved greatly as it is aided by technology, which is one of the resources brought about by the 4th Industrial Revolution. The 4th Industrial Revolution has provided online platforms that have revolutionised the traditional way of offering education for both basic and higher education (van der Berg 2008). However, the central purpose of this study is to determine the relationship between resource allocation, distribution, utilisation, resource provisioning, and learners' performance and achievement in public schools in Limpopo province.

## Literature Review

### **Racial Inequalities in Resource Allocation in Public Schools**

As Heitzer (2015) states, the new democratic system in South Africa inherited a highly divided and unequal education system, especially regarding the provision of school resources and learners' achievements. Despite the fact that racial differences in spending reduced significantly in the years leading up to 1994, the amount spent per learner in a white school was two and a half times larger than the amount spent on black learners in urban areas and five times larger than that amount spent on black learners in

the most impoverished homelands. According to Beeby (2016), from a school finance perspective, helping public schools to accomplish ambitious performance goals includes four actions, namely, providing sufficient resources to get the job done; distributing resources fairly to schools or learners; using resources productively; and accounting for resource use in ways that capture such productivity. However, Lockheed, Vail, and Fuller (1986) maintain that public schools now in post-democracy have to produce better results, regardless of whether their resources are increasing, declining, or remaining the same. Accordingly, the productivity component of this equation, that is, using resources to improve learners' performance, becomes more salient.

Stürmer and Seidel (2017) agree that school resource provisioning and learners' performance pose an enormous challenge to South African schools, as experienced by the majority of school managers, school governing bodies, school communities, administrators, and policymakers. Research has shown that there is still a markedly inequitable or tilted allocation, distribution, and utilisation of educational resources and learners' performance in public schools, especially those located in the marginalised, rural communities. Kimani, Kara, and Njagi (2013) discuss how the availability of teaching and learning resources enhances the effectiveness of schools as these are basic elements that may bring about sound academic performance on the part of the learners. They indicate that all institutions or organisations comprise human beings (workers) and other nonhuman resources. Kgosikebatho (2013) asserts in this regard that, when the right quantity and quality of human resources are brought together, it enables the effective manipulation of other resources towards realising institutional goals and objectives. Consequently, every institution should strive to attract and retain the best human resources available. However, the economic austerity of recent times in South Africa, coupled with the need to expand access to education, has presented educational planners with increasingly difficult choices in the allocation of available resources.

Nonetheless, until recently, the South African government has denied that there is a crisis in basic education (Hills, Dengel, and Lubans 2015). Perception changed when Angie Motshekga, the Minister of Basic Education, stated that "former African schools" exist as "a Cinderella system deprived of resources and characterised by pockets of disasters... this is akin to a national crisis." There has been evidence of poor educational outputs from the historically disadvantaged schools when compared to those of the historically advantaged schools, and when compared to the academic performance of learners in other countries (Hills, Dengel, and Lubans 2015). The physical, material, human, and financial resources invested in schools influence not only the education provided to learners but also aspects of teacher and learners motivation. Consequently, the government devised a key mechanism to redress inequality in schools through the implementation of a proper education budget policy that provided a framework for allocating "non-personnel recurrent costs on the basis of need" (Imazeki and Reschovsky 2008).

In terms of the laws and policies on funding, once state funds have been allocated to schools for either personnel or non-personnel expenditure, shortages in school budgets are made up by charging school fees or fundraising. School fees and other privately raised funds enable schools to supplement resources, for example, by employing additional teachers, building new classrooms, and the general resourcing of the school (Hu et al. 2014). No-fee schools, on the other hand, receive some funding from the government once the Minister of Basic Education has set a minimum level of funding per learner. This is known as the no-fee threshold and is supposed to comprise the minimum amount of funding necessary to provide learners with an adequate education. In 2015, the no-fee threshold was R1,116, in 2016, it was R1,177, and in 2017, it was R1,242. However, for the last few years, in some provinces such as Limpopo, there is no money for items such as chalk, photocopying, school security, and other necessities required to ensure that a school functions effectively (Fullan, Rincón-Gallardo, and Hargreaves 2015).

### **Allocation, Distribution, and Utilisation of Resources in Public Schools**

The allocation of resources is essential for the improvement of learners' performance and public schools are not able to operate without such allocation. Limpopo is one of the poorest provinces in South Africa, and the allocation of resources is a common problem. Hence, a lack of provisioning of essential resources adversely affects the process of teaching and learning in every school. Teaching and learning resources are the most visible components of government educational provision and their absence is often noted. The Minister of Basic Education has implemented a number of measures in previous years to improve and promote the allocation of resources to public schools. This is evident in the increased expenditure channelled to the improved test programme. According to one of the policy statements, a significant proportion of education expenditure should be channelled to the allocation of learning resources. For quite some time now, the poor academic performance of secondary school learners in Limpopo has been a matter of concern. The problem is that most learners do not perform at a level that would allow them for further studies such as a higher education institution (SACMEQ II & III).

Therefore, it was observed that studies conducted by certain researchers (Lemon 2004; Sedibe 2011) that focused on local resourcing and inequalities, especially at the school level, displayed certain limitations. For example, the studies did not address the important aspect of the allocation, distribution, and utilisation of resources to schools as predictors of learners' achievement in public schools. Research has shown some disparities in the way in which school resources are allocated, distributed, and utilised in public schools (Loeb, Soland, and Fox 2014). Accordingly, there is a need to focus on school resource allocation, distribution, and utilisation as predictors of learners' performance in public schools in Limpopo.

## **Educational Resources and Learners' Performance**

The issue of whether educational resources have an impact on learners' performance has long been a contested issue among scholars. Contrary to conventional understanding, Rice (2007) concludes that the total level of school resources is not closely related to learners' performance, although he challenged this interpretation of the research evidence in the case of smaller class sizes. The link between educational expenditure and outcomes has not been proven though it has been pointed out that research has suffered from poor quality data and has failed to fully examine the interactions between school inputs and resources (Picus 1997). The apparent absence of resource effects is at odds with conventional economic reasoning (Rice, Monk, and Zhang 2016). However, the range of empirical research that has failed to find a link between educational resources and school performance may be countered on the grounds that school inspections are primarily output focused. In the context of South Africa, the same challenge was being experienced at the time of the study because the majority of circuit managers (school inspectors) appeared to lack the capacity required to understand and assist schools in identifying their main challenges, such as the lack of basic resources, which in turn leads to poor performance, especially in historically disadvantaged schools (Gardiner 2007; NMF 2005).

A study conducted by Levin (2015) found that almost all visits by departmental officials to the schools where the research was conducted were concerned with whether the required scope of work had been covered (quantity). The input involving the resources and the processes used in teaching and learning were not even examined. Hedges, Laine, and Greenwald (2014) argue that to use data on the outcomes of education as the sole basis for accountability is to lose sight of the fact that aspects of provisioning (e.g. school buildings, curricula, educational materials, teachers' instructional techniques, and preparation activities) are also important. At the time of the study in South Africa, the focus of the circuit managers was on monitoring and supporting schools with reference to covering both the pacesetters and assessment tasks.

On the other hand, the availability, relevance, and adequacy of educational resources contribute to academic achievement performance, whereas unattractive school buildings, crowded classrooms, non-availability of playing grounds, and surroundings that have no aesthetic beauty may contribute to poor academic performance (Hanushek 2016). This argument is supported by Grissmer, Flanagan, and Williamson (2008), who stated that the absence of basic resources and the extreme overcrowding in schools in many developing countries mean that other factors (e.g. teacher subject knowledge) that are crucial for quality education may initially play a smaller role in the provision of quality education than may otherwise have been the case. However, even as the budget situation improves, more resources do not always generate a similar educational improvement. This may perhaps be because school and classroom organisation do not always adjust well to the efficient use of the additional resources or because there may be threshold levels beyond which adding further resources does not yield significant additional benefits for learning. However, research in the South African context has

shown that the provision of basic resources does have a positive effect on learners' performance (Sedibe 2011).

### **Financial Resources, Socioeconomic Features, and Learners' Performance**

According to Ballou (2008), compared to wealthy schools, poor schools also often have fewer financial resources, either because of budget limitations or because of inequitable resource allocations among schools. However, although additional resources are important, it is also critical to ensure that they are available in the right combinations and also that school and classroom organisation adjusts to using these resources effectively. This was also noted in the report on equality of educational opportunity by Chambers (2015), who found that black learners generally attended schools with fewer of the resources that seem most related to learners' achievement. Their schools had fewer laboratories, there were fewer books in their libraries and insufficient quantities of textbooks compared to the schools attended by white learners. In addition, the schools attended by black learners had fewer instructional resources and lower performance levels than those of white learners, suggesting a link between resources and performance. Despite the change in government in South Africa in 1994, the transformation process in addressing the inequalities in resource provisioning seem to have little impact, if not none (Bloch 2012).

For instance, in a study on the National Assessment of Educational Achievement, Coleman et al. (2016) found that, in Kuwait, learners in classrooms with libraries or reading corners scored higher on a literacy test (Progress in International Reading Literacy Study test) compared to learners in other classrooms. This was used as evidence to support the policy of the Ministry of Education to install classroom libraries in Kuwait. In South Africa, the Grade 3 systemic evaluation revealed an average score of 30% on the mathematics task. While the literacy average was 54% for reading, it was only 39% for writing. It is interesting to note that the majority of these learners were from poorly resourced schools (Drucker 2012). Ballou (2008) maintains that, given the fluctuating nature of performance in the selected schools, several aspects of provision accounted for school performance. His study isolated one aspect, namely, resource material and learner teachers, and attempted to determine the role of resource material in influencing a school's performance. The findings of this study should, therefore, serve as a targeted intervention to highlight a gap in the provision of education in poorly resourced schools.

Furthermore, research has supported the notion that learners' academic performance is related to individual differences between learners, the socioeconomic features of the environment in which they grow up, and the educational resources of their current school (Deakin Crick, and Goldspink 2014). The relationship between socioeconomic features and academic achievement has been extensively studied in both a national and an international context in recent years (Deakin Crick, and Goldspink 2014). However, there is a dearth of research on the relationship between the educational resources of a school and its academic performance. Educational resources are of vital importance in

terms of their role in attaining educational aims and objectives. In order to diminish the effect of socioeconomic inequality in Limpopo, educational resources are significant to provide equal opportunities for learners (Bohrnstedt et al. 2015). Research shows that school-related factors in South Africa play a critical role in predicting the learners' performance in public schools (Lingam and Lingam 2013).

However, it is not clear what level of resources determine the academic performance of learners. Broadbent and Poon (2015) recognise the impact of physical and economic resources on achievement. Physical resources may be categorised under the headings of people, equipment, and physical and economic resources (Voyer and Voyer 2014). In the South African context, there is serious debate about the relationship between school resources and learners' performance. Therefore, there is a need to obtain evidence on the extent to which school resources determine academic performance of learners in South Africa. Alexander (2006) argues that immediate attention should be paid to the concerns raised regarding the unequally resourced classrooms, unsafe schools, and traumatised teachers in the country. He suggests that teacher orientation aimed at addressing the prevailing gaps should enable teachers to appreciate the importance of their profession and in turn inspire them to serve as role models to their learners, which could translate to functional schools (Alexander 2006).

In terms of social inequality, van der Berg and Burger (2003) posit that there is a historical relationship between race, socioeconomic background, education spending, and educational performance. They posit that the percentage of school learners that were white, the poverty index, school fees, and the average level of qualification of teachers were significant when regressed on the mathematical performance index. They further revealed that the resource allocation variables in their dataset fail to contribute substantially to the explanation of black and coloured learners school results in the Western Cape province. In addition, the learner–teacher ratio, the physical index, teacher quantity, and the various measures of teacher quality all yielded statistically no significant coefficient. But they argued that the results point to a substantial role for omitted variables such as the availability of basic teaching resources and managerial efficiency in schools with predominantly black and coloured learners (van der Berg and Burger 2003).

According to the above discussions and findings, additional investment in variables such as teacher quality or quantity is unlikely to yield large improvements in matric results for the particular group of learners unless the required complementary resources and/or appropriate managerial skills and incentive structures are put in place (van der Berg and Burger 2003). These findings are in line with the results of a comparable study by Crouch and Mabogoane (2001), who found that matric results had a strong and positive correlation with the school's poverty index and the qualifications of the teachers.

Developing countries are behind developed countries in terms of educational resources such as the learner–teacher ratio, teachers’ levels of education, and school facilities. Furthermore, developing countries are behind developed countries in terms of academic achievement on an international scale (Graven 2014). According to a study conducted by Carrese et al. (2015) on the relationship between the learner–teacher ratio, the education level of teachers and school facilities, and learners’ performance, there is a weak relationship between educational resources and learners’ performance. In the case of South Africa, international studies have shown low levels and quality of competencies by the majority of learners (Zuze 2010). However, a recent study has confirmed significant improvements in the mathematics and science scores of South African learners (SACMEQ IV 2019; TIMSS 2015).

In terms of learner–teacher ratios on learner outputs, Glatthorn, Jailall, and Jailall (2016) reported positive effects of the learner–teacher ratio, educational materials, library size, and teacher education on learning outputs. For effective learning, some studies in low-income countries emphasise the significance of human and financial resources that include the infrastructure of schools, classroom size, teachers’ experience, teachers’ abilities, and educational materials (Graven 2014). However, the physical and financial potential of schools have been found not to have a significant effect on performance. In South Africa, research reveals that the performance of learners is significantly poorer in higher grades compared to lower grades. The main reason for this is the fact that the disparities in resource provisioning is more predominant in the public secondary schools than in public primary schools (Bansilal 2012). The implication for the new study on predictors of resources provisioning this research in public school is based on the argument that most literature ignored or failed to articulate determinants of resource provisioning and extent it affects academic performance of learners in rural schools of South Africa.

In addition, some studies point to the effect of teachers’ qualifications on academic performance. According to Cueto et al. (2014), the professional experience of teachers has a significant impact on the mathematics performance of learners. In other words, teachers with more experience have a significant effect on mathematics performance when compared to beginner teachers with one to three years’ experience. Other factors that affect learners’ achievement include the attitudes and behaviour of teachers. Teachers’ values, attitudes, and experiences affect their learners, colleagues, careers, and society while, naturally, teachers’ personal and professional existence is affected by the same factors (Sleeter 2014).

Mestry and Ndhlovu (2014) maintain that significant teacher qualities include verbal ability, knowledge of the field in which they are teaching, knowledge on how to teach and learn, and the ability to use teaching strategies based on the needs of the learners. In this regard, Demir, Kilic, and Depren (2009) found that the educational level of teachers, length of service and whether or not they had participated in in-service training have a significant effect on the academic performance of learners. On the other hand,



some studies, such as Foster (2014), indicate that length of service is not a good predictor of learning outcomes.

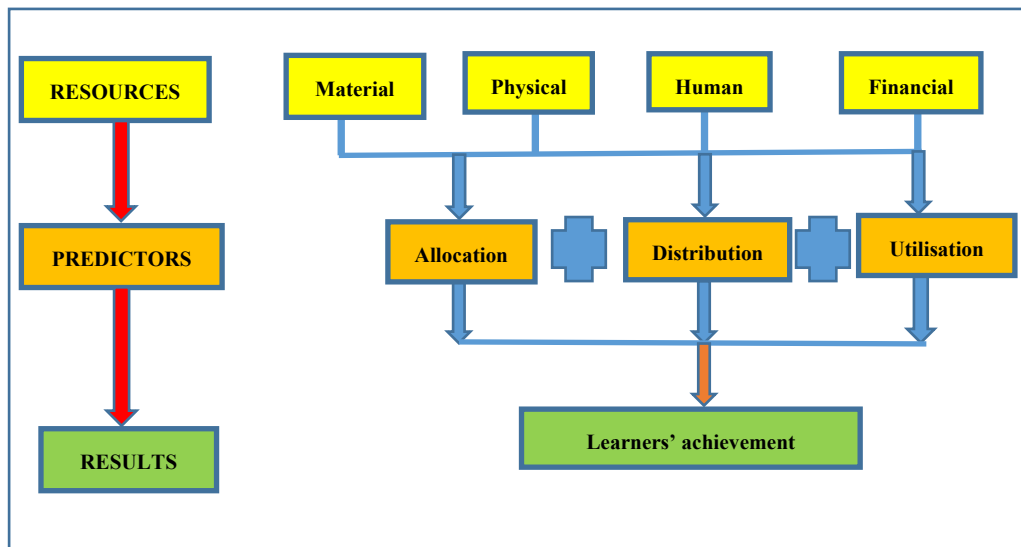
To sum up, the educational resources in schools play an important role in diminishing the effect of socioeconomic factors on academic performance and in creating equal opportunities for learners. Accordingly, it is crucial to investigate the relationship between a school's educational resources and the academic achievement of learners (Hansen and Gonzalez 2014).

## Conceptual Framework: Education Production Function Theory

This study applied a neoclassical economic theory known as the education production function theory (EPF). The theory, which originated in the 1950s, is based on Jacob Mincer's application of human capital theory to the measurement of the economic return of education. The theory is based on two assumptions: firstly, one of the assumptions derived from this theory is that the number of years of schooling an individual receives has an impact on earnings; secondly, the basic assumption of this theory is that an increase in resource inputs will automatically lead to an increase in educational outcomes. Initially, the theory focused on the estimation of the relationship between the supply of selected schooling inputs and educational outcomes. The proponents of the theory tried to justify the above relationship by controlling the influence of various background factors which also play critical roles in learners' achievement (Scheerens 1997). The theory describes how there is little consensus on the definition and measurement of the inputs, processes, and outputs of education. The outputs depend on how the inputs are processed through teaching and learning within the school system. However, it would appear that this arises from a lack of agreed-upon goals for education that may be translated into operational and measurable objectives and, hence, there is no standardised unit of outputs and inputs. Thus, the inputs refer to the allocation of resources which include qualified and experienced teachers and the school's teaching and learning materials, financial resources, and physical facilities, while the result – the output – is the learners' performance and achievement. In this study, measures such as the experience and qualifications of heads of departments (HODs) and teachers, physical facilities, and all material resources used in teaching and learning were used as inputs, while specific measures of outputs were the grades (e.g. eligibility to enter bachelor's degrees, diplomas etc.) attained by the learners in examinations.

However, a number of researchers have disputed the notion that there is any relationship between school resources and learners' achievement, especially in developed countries (Hanushek 2008, 2010). But both Fuller (1985) and Hanushek (1995) found tentative evidence that school resource inputs were more strongly linked to schooling outputs in developing countries. Furthermore, school resources such as the textbooks, learners' writing materials, teachers' tertiary education, and school facilities were also highlighted as some of the most important determinants of learners' achievements in the developing nations (Hanushek 1995). This implies that the theory may be predicted

in terms of how it may be applied as its application differs from one environment to another.



**Figure 1:** The conceptual framework of the study

The conceptual framework in Figure 1 has three variables, namely resources, predictors, and results, guiding the findings and interpretation of the study. The resources comprise teaching materials, physical facilities, and human (viz. teachers) and financial resources. Predictors relate to the allocation, distribution, and utilisation of resources. Finally, the results are the learners' performance, which are a result of the education production process. In view of the discussion, it is important to indicate that the above theory has the following characteristics: firstly, the major type of initial condition required is the selection of resource inputs. The resource inputs referred to in the theory include variables such as teacher quality, teacher–learner and learner–teacher ratios, teachers' salaries, and school allocations from the Department of Basic Education. Unfortunately, the initial condition is, in most cases, absent in poor communities and this makes the application of this theory difficult, if not impossible. Secondly, this should be followed by the measurement of the direct, rather than causally mediated, effects (black-box formulations) data at one level of aggregation, i.e., either micro (learner) level data or school and even district level data (Monk 1989). However, the second characteristic does not address the critical aspect of what really happens in the classroom where teaching and learning occurs. Thirdly, and unfortunately, the third characteristic is that the theory is viewed as a more static and traditional model rather than as a dynamic model. In this study, the theory has been used in a dynamic way.

The study has managed in its discussion to provide critique that may be made in relation to the analogy on which theory is based. The proponents of the EPF theory tend to make

an analogy between the knowledge acquisition process of a human being and the production process of a firm (Todd and Wolpin 2003). Furthermore, they claim that the above analogy provides a conceptual framework that guides the choice of variables and enables a coherent interpretation of the effects of such variables.

Proponents of this theory believe that the primary goal of empirical research, guided by the same economic theory, is to understand the technology for combining school inputs to create cognitive achievement outcomes. Unfortunately, this study found that the theory is easily seen as being difficult to understand and because it tends to reduce the productivity of education to a narrowly measured set of inputs and outcomes. In the discussion below, the researcher indicates the usefulness of the theory to the study and shows how the theory applies to the problem being investigated.

This research study applied EPF theory in guiding the discussion on resource provisioning as a predictor of learners' achievement in public secondary schools in Limpopo. The theory uses the input-process-output model. According to Bowles (1970), EPF theory refers to the relationship between school and learner inputs and a measure of school output. Hanushek (2003, 2008) views EPF as a simple production model which lies behind much of the analysis in the economics of education. Johnson (1978) argues that economic theory may be used to explain education production theory. The researcher in this study indicated that the common inputs included availability of school resources, teacher quality, and family attributes, and the outcome was learners' performance. The latter aspect was relevant to this research study which focused on resource provisioning as the predictor of learners' performance in public schools in Limpopo. Rice and Schwartz (2012) define education production functions as those functions that link "school inputs to educational outcomes and identify the impact of changes in inputs (e.g., teachers) on learner performance outcomes (e.g., achievement as measured by test scores)."

The study was guided by the following research question: To what extent is resource provisioning a predictor of learners' performance in public schools in Limpopo province, South Africa?

## Research Methodology

This study used quantitative research design to collect and analyse data. Majid (2016) maintains that a quantitative study is concerned with statistical methods and large samples, often randomly selected. A total of 272 participants completed the questionnaires for this study. The characteristics of the sample and the sample size are outlined in Table 1.

**Table 1:** Sample size

Target population	Amount	Sample size	Percentages
Principals	1,250	68	5
Teachers	31,250	68	0.31
Heads of departments (HODs)	5,000	68	13.6
School governing body (SGB) members	8,750	68	1
Total	46,250	272	19.9

Therefore, a quantitative method was used to gather a range of comprehensive answers to structured or closed-ended questionnaires based on the sample size.

## Sampling Design

The target population of the study consisted of five education districts in Limpopo, including principals, teachers, SGB members, and HODs. A combination of cluster and purposive techniques were used to select the sample. Schools were organised into clusters based on their respective districts. Following that, four key professionals with relevant information were chosen from each cluster using the purposive sampling technique. Principals, teachers, SGB members, and HODs were among the professionals considered as respondents. Because the field of study was technical and required individuals with the necessary information in each situation, the purposive sampling technique was used. The final sample was composed of 68 public secondary schools drawn from 1,354 public secondary schools with different profiles, backgrounds and quintiles (1 to 5), selected from five districts (viz. Capricorn, Vhembe, Mopani, Sekhukhune, and Waterberg).

## Instrumentation and Data Collection

Data were collected by means of a questionnaire, which was generated containing both open- and close-ended questions and then administered to the principals, teachers, HODs, and SGB members. There were four categories of questionnaires, namely those for principals, teachers, HODs, and SGB members. The questionnaires included a section that required basic demographic information such as the respondent's gender, length of service, and qualifications, as well as the demographic characteristics of their school, for example, school enrolment and the allocation of resources. After screening the questionnaires, 222 (82%) usable questionnaires were retained out of a total of 272 questionnaires emailed to respondents. Furthermore, out of the total 222 questionnaires administered using the drop and collect method, 54 (24.4%) were returned by principals, and 56 (25.2%) were fully completed by teachers, HODs, and SGB members. This resulted in 222 questionnaires being used in the final data analysis. The respondents were given two weeks to complete the questionnaire. Several ethical considerations were taken into consideration during the data collection process, including participants'

rights to anonymity, voluntary participation, confidentiality, and protection from victimisation.

## Data Analysis

Data were analysed using the Statistical Packages for the Social Sciences (version 26). The strengths and direction of relationship between the provision of school resources and learners' performance in public schools were measured using Pearson correlation analysis, and predictive relationships between constructs were measured using regression analysis.

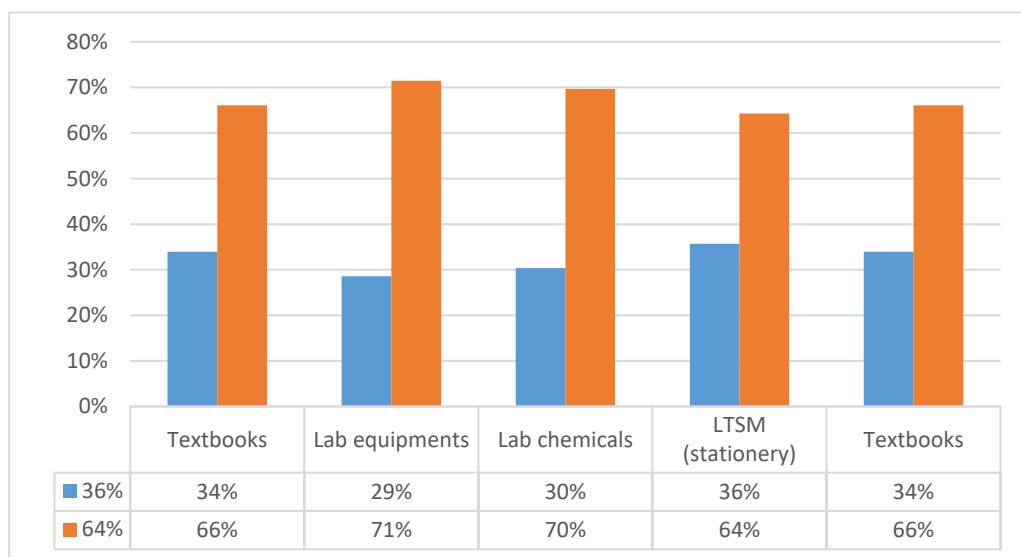
## Validity and Reliability

The questionnaire was reviewed by two university statisticians, who are experts in the field, to determine face validity. Their feedback was used to modify the questionnaire in order to establish face validity. A pilot study with a conveniently selected sample of 30 respondents was conducted to establish content validity. The feedback from the pilot sample was used to make additional changes to the questionnaire, and the pilot sample was left out of the main questionnaire. The Pearson correlation was used to determine construct validity. The correlation analysis results revealed positive correlations between the constructs, indicating acceptable construct validity. Regression analysis was used to test the predictive validity. The regression analysis results revealed statistically significant relationships between the constructs, indicating that the scales had adequate predictive validity. Cronbach's alpha coefficient was used to assess reliability; all measurement scales achieved alpha values greater than the recommended threshold of 0.7, indicating satisfactory reliability in the study.

## Findings and Discussion

### Summary Data for Merged Items on School Resource Allocations

The merged views of the respondents from all the sampled public schools in the districts in relation to the allocation of budgets for the provision of teaching and instructional resources are shown in Figure 2 below.



**Figure 2:** Views of the respondents from all the sampled public schools in the districts in relation to the allocation of budgets for the provision of teaching and instructional resources. Blue indicates that a budget was allocated, and red indicates that there was no allocated budget for the item.

The majority of the principals, HODs, and teachers in the 568 sampled schools indicated that their schools had not budgeted for the provision of textbooks and stationery (LTSM) — approximately 66% and 64%, respectively. This finding was not, however, surprising as it is a fact that the Department of Basic Education delivers textbooks and stationery annually to all public schools in Limpopo. This is confirmed by the judgement handed down by the Gauteng High Court Judge in June 2012 which found that the Department of Basic Education violated the rights of learners by failing to deliver stationery and textbooks to public schools in Limpopo on time. The litigation was undertaken by the NGO Section 27 on behalf of the social movement, Equal Education, which represents learners in rural public schools in South Africa including Limpopo.

However, some of the respondents confirmed that their schools had budgeted for the provision of LTSM. The schools which allocated their budgets to the provision of LTSM were typically quintile four (Q4) and quintile five (Q5) schools, which are fee-paying schools. Of the principals, HODs, and teachers, about 71% and 70%, respectively, indicated that their schools had not budgeted for the provision of laboratory equipment and laboratory chemicals. Unfortunately, the Department of Basic Education is not able to provide laboratory equipment and chemicals and public schools are therefore expected to utilise either their school budgets or money raised through fundraising activities for the provision of such items. On the other hand, about 29% and 30% of respondents, respectively, confirmed that their schools had budgeted for the provision of laboratory equipment and chemicals.

**Table 2:** Merged responses of the principals, HODs, and teachers in relation to the location and quintiles of the sampled public schools

School	Frequency	Percent
Farm (Q1)	3	5.4
Rural/village (Q2)	35	62.5
Township (Q3)	8	14.3
Town/city (Q4 and Q5)	10	17.9
Total	56	100

The majority of the respondents (62.5%) indicated that they were teaching in public schools located in either rural areas or villages. These rural schools are categorised as quintile two (Q2) schools and have been declared as “no-fee” paying schools. The reason for this is because of the low socioeconomic status of the communities and/or parents in rural areas and/or villages. Consequently, parents are often unable to afford to pay school fees which may cover the provision of adequate school resources. These schools are considered poorly resourced schools and are the second poorest schools after farm schools (Q1). Of the respondents, 17.9% indicated that they were teaching in public schools located either in towns or cities. These schools are categorised as either quintile four (Q4) or quintile five (Q5) schools and are fee-paying schools. These types of schools usually have extensive infrastructure and other school resources and are sometimes considered better-resourced schools. Most of the learners from these schools are from middle-class and wealthy families who are able to afford to pay school fees charged by fee-paying schools.

Of the respondents, 14.3% indicated that they were teaching in public schools located in townships. Township schools are categorised as quintile three (Q3) and are fee-paying schools. This means that school fees are required for all learners in these schools, as set by the SGB, with the amount of the school fees charged being the amount agreed to by parents at the annual general meeting. Of the respondents, a minority of 5.4% indicated that they were teaching in public schools located on farms. These schools are sometimes referred to as farm schools and are categorised as quintile one (Q1) schools, and they are “no-fee” paying schools. This means that the schools in this category are not supposed to charge school fees for learners. The public schools in this category are the poorest schools in the country in terms of the provision of school resources.

### **Learners’ Performance by Percentage Pass Rate and Resource Allocation, Distribution, and Utilisation**

The relationship between the resource provision (allocation, distribution, and utilisation) and learners’ performance in terms of degree/diploma pass rate is outlined in Table 3.

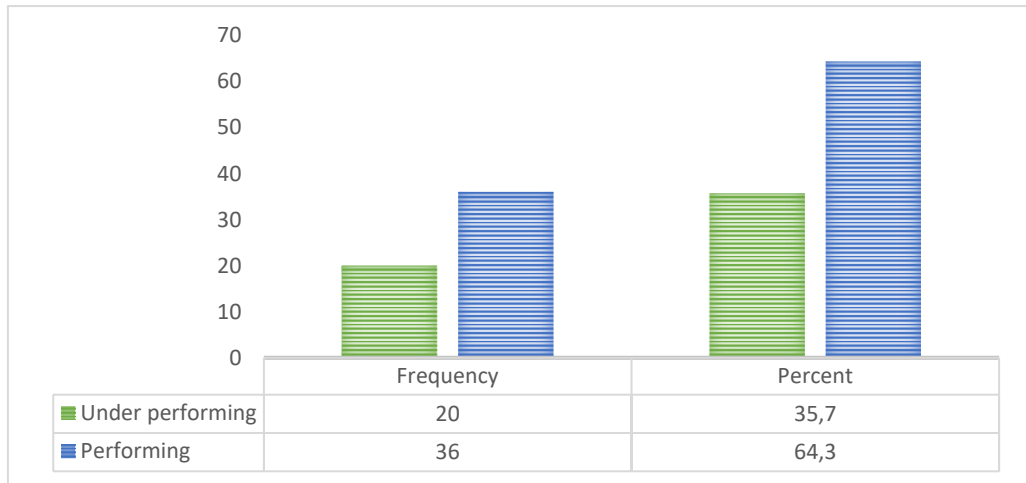
**Table 3:** Learners' performance in terms of degree/diploma pass rate and resource allocation, distribution, and utilisation

Variables	Learners' performance in terms of degree/diploma pass rate		P-value
	Underperforming	Performing	
Allocation			0.085
Efficient allocation	3 (5%)	20 (36%)	$\chi^2 = 2.976$
Inefficient allocation	11 (20%)	22 (39%)	
Distribution			0.741
Equitable distribution	4 (7%)	14 (25%)	$\chi^2 = 0.109$
Unequitable distribution	10 (18%)	28 (50%)	
Utilisation			0.212
Maximal utilisation	4 (7%)	20 (36%)	$\chi^2 = 1.556$
Minimal utilisation	10 (18%)	22 (39%)	

Table 3 shows that 39% of the school resource allocation with inefficient allocation is likely to perform as compared to those underperformed, namely 20%, while 36% only of the school resource allocation with efficient allocation was likely to perform better than underperformed, namely, 5%. Using the chi-squared test ( $\chi^2 = 5.707$ ,  $p = 0.017$ ), since  $p < 0.05$ , there is a significant association between school resource allocation and learners' performance.

In terms to school resource distribution, Table 3 shows that more than 50% of school resource distribution with unequitable distribution was likely to perform as compared to those that underperformed, i.e., 18%, while 25% of the school resource distribution with equitable distribution was likely to perform better compared to underperformed, namely 7%. Using the chi-squared test ( $\chi^2 = 2.103$ ,  $p = 0.147$ ), since  $p > 0.05$ , there is no significant relationship between school resource distribution and learners' performance. Lastly, in terms of school resource utilisation, Table 3 shows that over half of the school resource utilisation with minimal utilisation was likely to perform as compared to those underperformed, i.e., 18%, while 36% only of the school resource utilisation with maximal was likely to perform better as compared to underperformed, 36% and 7%, respectively. Using the chi-squared test ( $\chi^2 = 4.051$ ,  $p = 0.044$ ), since  $p < 0.05$ , there is a significant relationship between school resource allocation and learners' performance.





**Figure 3:** Merged views of respondents on the percentage pass rate at the sampled schools

Of the merged group of principals, HODs, and teachers, 64.3% indicated that their schools were maintaining a 65% pass rate in the National Senior Certificate examinations and that their schools had achieved more than 30% of degree and diploma passes combined. However, the remaining group of respondents, 35.7%, indicated that the pass percentage in the National Senior Certificate examinations at their schools fell below 65% and that their schools had achieved less than 30% degree and diploma passes combined (see Circular D2 of 2017 on the identification, management, and support of underperforming schools). The findings above confirm that the provision of school resources plays a critical role in improving learners' performance.

Of the schools included, 64.3% of performing schools were located in the rural areas as well as townships. However, the sampled rural schools which were performing well had received extensive school resources with some of them even being termed state-of-the-art schools because of the nature of their infrastructure and other teaching and instructional resources. The majority of these schools have been declared fee-paying schools because they had applied to be categorised as quintile four (Q4) in order to supplement their resources for the purposes of maintenance and repairs.

## Concluding Remarks

It is clear from the study that resource provision was shown to be a determinant predictor of learners' performance in public schools in this population of Limpopo. The study highlighted that the way in which school resources are allocated, distributed, and utilised has an influence on learners' achievement. It also emerged from the study that there are not sufficient teaching and learning resources available and that there is a shortage of physical facilities. In addition, the few available physical facilities are in a

poor condition/state and are often too small/insufficient. Recreational facilities are inadequate and there is a gross lack of human resources. The majority of rural public schools are staffed by unqualified and underqualified teachers. An analysis of the physical facilities revealed that they are over-stretched with the teachers further indicating that the lack of facilities had a negative impact on the performance of learners in public schools. Teaching and learning materials tend to be inadequate and should be shared, especially in the compulsory subjects. Human resources are an issue of serious concern as the enrolment rate in schools increases every year, thus leading to inadequate curriculum supervision and implementation in schools. The study also established that the allocation of human resources was not carried out either efficiently or effectively.

Therefore, it is recommended that:

- The government should allocate more funds to equip physical facilities in schools with inadequate or lack resources.
- Schools should employ more teachers to cater for the enormous teacher shortages.
- The Member of the Executive Council in Education in Limpopo should be provided with resources to carry out advisory work more effectively in schools.
- The government should provide more classrooms or schools to accommodate the influx of learners to address overcrowding in schools.

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