

## Assessing the Effect of Pupil – Teacher Ratio on the Performance of Grade 9 candidates: A Case Study of Selected Schools in Ndola (Paper ID: CFP/1354/2019)

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**Abstract --** This study was designed to assess the effect of pupil-teacher ratio on performance of grade 9 examinations in selected schools in Ndola District. The purpose of this study was as follows: - (a) to evaluate the impact of Pupil Teacher Ratio on academic performance of grade 9s in National Examinations. (b) Assess the existence of the ideal Pupil Teacher Ratio in Zambia. (c) To identify the major challenges faced in the attainment of appropriate Pupil Teacher Ratio in Zambia's public schools

This research revealed that Mission and Private schools have better staffing levels as compared to Government schools. As a result, the well-staffed schools perform better academically. Most Government schools have staff shortages as well as inadequate infrastructure at all levels of our education system. The consequences of the current high pupil-teacher ratio include low levels of attention to individual pupils, shortage of text books and other learning materials, inability to effectively carry out practical lessons, lack of attention by pupils because of distractions from the many classmates and many more. The research also showed that Government schools have the highest teacher – pupil ratios and as such there is inadequate contact time between pupils and teachers. This affects the pupils negatively especially the slow learners.

Findings from the study show that there is significant relationship between teacher- student ratio and academic achievement of students. Pupils in large classes drift off task because of too much instruction from the teacher to the whole class instead of individual attention, and low-

attaining students are most affected. As public schools across the country continue to feel the effects of state budget cuts, the importance of student-to-teacher ratio and class size has bubbled to the surface. Arising from the findings, the paper recommends that the challenge of teaching in large classes should not be left to school administrators and teachers alone but should be faced at all fronts by all stakeholders. Based on the findings of the study, the Ministry of General Education should consider introducing team teaching in order to ease some of the challenges faced by teachers of large classes. The Government must set up deliberate policies to motivate teachers so that they do not leave the teaching profession especially after they have upgraded their studies to join other professions. The government should increase its staff development in the education sector each year and should quickly replace teachers who resign or die so that staffing levels do not drop but improve each year.

This study showed that a decline in pupil-teacher ratio increases overall performance of pupils in public schools. There is need for government to employ more teachers. This will enable attainment of recommended PTR in schools which currently is far above the required standards. It will also help to offset the problem of teacher shortage as a result of over-enrollments. It is therefore important that the number of pupils per teacher should be taken into consideration by the government and other education sector stakeholders in formulating policies in the schools.

**Key Terms:** Students, Pupil-teacher ratio, Performance, Impact, Class size, Contract teacher

## D) 1: INTRODUCTION

Education is often viewed as one of the primary drivers of economic development. Education concerns itself with the acquisition of knowledge, skills and attitudes which are relevant to the survival of human beings. According to United States Aid (USAID 2013), education is the key to sustaining democracies, improving health, increasing per capita income, and conserving environmental resources. The United Nations Educational Social Cultural Organization (UNESCO, 2011) contends that up to 20% of the world's income growth could be traced to education.

Provision of quality Education to all school-going children poses a fundamental challenge to education and training systems in most countries, Zambia included. Studies in education have shown that achieving quality education in Zambia still possess as a major challenge. Among the other challenges are the issue of improving quality and increasing learning achievement. There have been calls for improving education access for the World. (UNESCO, 2011).

### 1.1.1 Pupil - Teacher ratio as a Parameter for quality education in Zambia

Amongst all the education indicators, quality is the most difficult aspect to measure. Often times, quality is erroneously attributed to the optimal provision of education inputs and not the learning achievements. According to this view, the Quality of education is high if the school is well-resourced with inputs such as highly qualified teachers, teaching and learning materials, infrastructure, relevant curriculum and students (World Bank Group 2015). At output level, assessment frameworks focus on measuring demonstrable competencies that benchmark performance and are perceived to provide insights on the quality of education provision.

The performance of the Zambian education system is monitored using a set of indicators that measure a number of aspects relating to the education system. The core indicators that the Ministry of General Education use mainly measure four aspects of the education system namely, Access and Participation, Quality, Efficiency of education delivery and Equity. It is however noteworthy to acknowledge that the quality indicators by and large have a biasness towards quantitative dimensions. Some of the indicators used to monitor quality of education are mainly by proxy and are ingredients for short-term educational products such as pupil teacher ratio, pupil classroom ratio, teacher class ratio, textbook pupil ratio, curriculum relevance, quality of teachers, learning achievement levels, percentage certificates and percent of students meeting the defined achievement levels (MoGE 2015a).

Though the inputs and outputs model has historically been the major assessment criteria for Zambia, investments in this model have resulted in very little improvements in the quality of education at all levels. As a result, there is currently a growing shift in focus towards the inclusion of genuine education outcomes, which although more complex and abstract, measure permanent changes relating to positive behavior, high productivity, and other qualities as espoused in the national education policy. Thus, Zambia recently adopted the UNESCO educational quality framework which draws most of its elements from the humanist educationalist model. The UNESCO model has been adopted by Zambia as part of the Standards and Evaluation Guidelines launched in 2015 by the Ministry of General Education. This model places more emphasis on the input-process-output view of quality.

### 1.2 Background to the Study

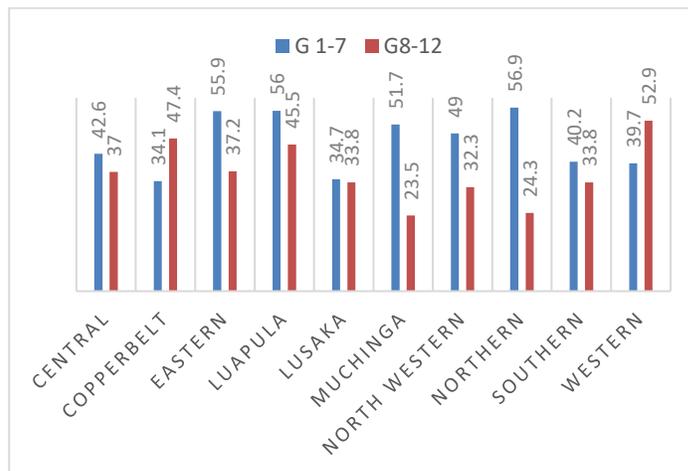
There is currently an insufficient number of schools at all levels and approximately 15% of the school age

population is not enrolled because of lack of places. The 1990 population census showed that an estimated 66% of the adult population is illiterate (mainly women). In 1995, 26.7% of the population aged 15+ was illiterate. Due to the above, most government schools are over populated which has led to the increase of the teacher – pupil ratio.

Large class size on the other hand is often impersonal, having broader curricula with teachers being given wider support, while students may suffer discipline problems as teachers cannot get to know their students very easily. They find it easy to stream students according to ability while commitment to work may stand a test of time. Therefore, considering the vitality of the problem, this study investigates the effects of student- teacher ratio on academic achievement of students.

According to the Educational Statistical Bulletin 2016, the following statistics were recorded, infrastructure development has continued in order to increase the classroom spaces at all levels. In 2015, the total number of permanent classroom spaces reported for secondary schools was 9,115; this increased to 10,113 permanent classrooms in 2016. A total number of 96,228 teachers were reported in 2016 showing a decline of 1,812 from 98,035 in 2015. The number of primary school teachers was 73,949 and 22,279 secondary school teachers. Of the total 1,812 teachers decline from the 2015, 1,287 were primary school teachers while 520 were Secondary school teachers.

In terms of provincial distribution of teachers, table 47 shows that Copperbelt had the highest total number of teachers and was followed by Lusaka both at primary and secondary levels. Muchinga province reported the least number of primary teachers while Western province had the least number of secondary school teachers.



**Figure 2: Pupil – Teacher Ratio by Province**

A number of factors influence the interaction between teachers and students in the classroom such as: educational course, the division of the teacher's time between the teaching and other tasks and grouping of students within the classroom and teaching practice in groups or teams.

In small class (with fewer students), the teacher has an idea, anticipation and complete records for each student and also for their achievements or full performance. On the other hand, in large classes (with more than 40 pupils), the motivation of learning and also the assessment of learning cannot be at the right level, because most of the time the assessment is made only through tests or essays as teacher does not have an idea in advance, or assessment for his students during the academic year due to the large number of students in class.

This is therefore the major reason why this study looked at the effects, pupil teacher ratio on the performance of grade 9 examinations. The research will also sample the schools within the district of Ndola and later draw a conclusion because the study population drawn represents different schools found in Zambia.

### 1.3 Statement of the Problem

Despite the Zambian government's efforts to provide free primary education, there has been a considerable success with regard to increased enrolments but the challenges have been enormous.

In many secondary schools around Ndola the pupil teacher ratio is very high. The teachers employed to teach in most schools is much lower as compared to the number of pupils enrolled in the schools. Some researchers have not found a connection between smaller classes and higher student achievement. The researcher believes that good pupil teacher ratio can be an important tool in attaining good examination results. Therefore, this study sought to establish that if pupil - teacher ratio is reduced in schools in Ndola, it can play a significance role in terms of achieving good grade 9 examination results.

### 1.4 Research Objectives

The study was guided by the following objective: To investigate the influence of pupil-teacher ratio on the performance of grade 9 examinations in Zambia.

The specific objectives were:

- 1) To determine the experiences and challenges faced by teachers and pupils of large classes.
- 2) To determine the contribution of the outputs of pupils where the teacher-pupil ratio is high.
- 3) To identify the teaching strategies used by teachers in handling large classes.
- 4) To find out why some schools produce good examination results while others do not.

### 1.5 Research Questions

- 1) What are the experiences and challenges faced by teachers and pupils of large classes?
- 2) How overcrowded classrooms affect the teaching-learning process?
- 3) What strategies do teachers handling large classes use when teaching?

- 4) How have some schools managed to maintain good examination results?

### 1.6 Theoretical Framework

This research project was based on the principle that if Staffing Levels in Schools is improved, this can greatly contribute to the good performance of grade 9 examination results.

### 1.7 Significance of the Study

This study is cardinal because it will add to the already existing knowledge on staffing levels of teachers in Zambia. The government will have an insight on how staffing levels can contribute to high quality of examination results and development of the nation. This will enable the government and the stakeholders to come up with appropriate measures which will encourage and foster the provision of quality and professional education. The study was also a partial fulfillment for the award of a Master's Degree in Education.

### 1.9 Scope of the Study

The research covered the period from November 2013 to March 2017. The research was restricted to the selected urban area of Ndola. It was restricted to looking at the extent to which Staffing levels contributes to improving the grade 9 examination results.

### 1.10 Limitation of the Study

In the process of carrying out the research, the limitations that were encountered included insufficient time to carry out the research as some respondents may take long to fill in the questionnaires, limited financial resources and lack of proper information on the recruitment of teachers. The research itself was a biased accomplishment for the award of the Master's Degree of Education, and the study focused on a small sample size.

## II) LITERATURE REVIEW

As public schools across the country continue to feel the effects of state budget cuts, the importance of student-to-teacher ratio and class size has bubbled to the surface. Despite conflicting positions on the issue, many education policy advocates overwhelmingly indicate that a low student-to-teacher ratio can increase student achievement, enhance a child's test scores and provide lasting academic benefits. The possible benefits of smaller classes must be weighed against the costs. To reduce class size in a meaningful way, school districts might need to hire more teachers, add more classes, purchase more supplies or all the above.

### 2.1 Challenges faced by teachers and pupils of large classes

In a study done in Ethiopia by Verwimp, it is argued that there is a negative correlation between the quality of teaching and the pupil-teacher ratio. A teacher in the classroom is a main instrument for bringing about qualitative improvement in teaching and learning activities. Such quality is maximized where there are enabling and supportive environments where the pupils participate actively in the process and where pupils, teachers and schools have opportunities for institutional growth. The pupil-teacher ratio in primary school in Tanzania was last reported at 50 and 76 in 2010, according to a World Bank report (2012).

According to UNESCO (2012) it is estimated that over 84 per cent of classrooms in developing countries Zambia inclusive had over 40 pupils per teacher. The PTR in most developing countries is high due to the large enrolments that have done in the quest for universal primary education. The high enrolments and coupled with reduced number of teachers in many schools, has made the available teachers face serious obstacles in an attempt to deal

with over-crowded classes. These high enrolments have led to compromise on teaching efficiency in the schools which is one of the main reasons for the poor quality of education offered in many primary schools in the developing countries (UNESCO, 2012).

Research has revealed that though developing countries have been able to improve the percentage of literacy to impress the international fraternity, the quality of education provided has been a major concern due to congested classrooms resulting from high enrolments. One of the major indicators of quality is the pupil-teacher ratio. UNESCO, Institute of statistics (2011).

The Ministry of Education in Zambia is responsible for education in the country. The government encourages partnership in the provision of education, in accordance with the policy of liberalization promoted by the Movement for Multi-party Democracy. The private sector can establish and administer schools at all levels. The quality of education in some private schools is considered to be higher than that of government schools because of many factors. The classes are small in terms of pupil-teacher ratio and there is a sufficient stock of learning materials.

The University of Zambia and all the colleges together train over 2,000 teachers annually; enough to staff 3,700 primary and 600 secondary schools adequately. But the teacher recruitment levels by the government in schools are far from satisfactory, because of the high attrition rate of teachers. The Ministry of Education fails to retain its teachers because the conditions of service in the Zambian Teaching Service do not compare favorably with those obtained in other sectors within the country and in the neighboring countries. About 10% of the

teachers, therefore, leave the public education system every year. Ministry of Education (2000).

The impact of class size and pupil-teacher ratio on educational outcomes is among the most researched areas in education. By 1980s, more than 200 studies had appeared on this topic (Hanushek, 1995). Some of the studies which have been conducted in different parts of the world that relates to this study include the following: Class size reduction studies and the Meta-Analysis research in Far West Laboratory, Large scale studies on class size and student achievement in America, Impact of large classrooms on student academic achievement and engagement, Lessons Learnt from South African Consortium for Monitoring Education Quality (SACMEQ) and Studies on impact of large classrooms after implementation of FPE in Kenya.

The ratio of students to teaching staff compares the number of students (in full-time equivalent) to the number of teachers (in full-time equivalent) at a given level of Education and similar types of institutions. However, this ratio does not take into account the amount of instruction time for student compared to the length of a teacher's working day, nor how much time he spends teaching. It therefore cannot be interpreted in terms of class size.

### **2.1.1 Effect of overcrowded classrooms on the teaching-learning process**

Classes with too many students are often disrupting to education. Also, too many students in a class results in a diverse field of students, with varying degrees of learning ability. Consequently, the class will spend time for less academic students to assimilate the information, when that time could be better spent progressing through the curriculum. In this way, student-teacher ratios are compelling arguments for advanced or honors classes. Numerous

sources argue that lower student to teacher ratios are better at teaching students' complex subjects such as physics, mathematics and chemistry, than those with a higher ratio of students to teachers.

Quality assurance is regarded as a process and practice primarily concerned with conformance to mission specification and goal achievement within the publicly accepted standards of excellence (Okereke, 2008). It is a strategy for ensuring quality in the school system (Ololobou, 2008). According to Vlasceanu, Grunbery and Parlea (2004), quality assurance refers to an aggregate of actions and measures taken regularly to assure the quality of education products, services, or processes, with an emphasis on assuring that a prescribed threshold of quality is met.

Quality assurance means putting in place appropriate structures, legislations, supervision of personnel and materials in order to ensure that set minimum standards are attained, sustained and seen to have meaningful impact on society. Quality assurance is important because it ensures that goods and services produced in a country are of the highest possible standard, as well as protecting buyers from purchasing sub-standard products (Uya, 2008).

According to Oriaiife in Maduewesi (2005), quality assurance is a baseline standard in education which can be measured on a scale of reference. It is an expression of standard or a means by which a certain set standard in education can be achieved. It could easily be deduced therefore that quality assurance in education is a totality of the combination of such indispensable variables as quality teachers, quality instructional materials and quality infrastructure (classrooms, seats, tables, chalkboards etc.). Others include; favorable teacher/pupils' ratio, favourable

pupils/classroom ratio and quality instructional supervision.

In Zambia there only 71,000 teachers, for a total of 3.4 million students which is a ratio of 100:1 pupil to teachers. Schools lose more than 12% of their teachers each year due to death, sickness, professional isolation and a lack of social amenities. It is very hard to attract and retain teachers in rural areas – particularly female teachers.

Most of Zambian schools have a higher teacher-pupil ratio as a result the delivery of quality education is affected. Education is important in the social and economic development of individuals, communities and society could not be underscored. An educated individual has the ability to make informed decisions which enables them an opportunity to control and direct development; education is transformational, it is a powerful driver of development.

The pupil teacher ratio measures the number of pupils per teacher. It reflects teacher workload and the availability of teachers' services to their students. The lower the pupil-teacher ratio, the higher the availability of teacher services to students. The pupil-teacher ratio has implications not only for the cost of education, but also for the quality. The ratio is often used as a substitution for class size, although other factors that can lead to class size varying independently of pupil-teacher ratio (and vice versa). Smith, Robert (2011).

In Kenya according to MOEST (2004) the PTR has been increasing due to escalating teacher shortages. The Kenyan government introduced cost-free schooling. The implementation of FPE programme witnessed a 10% increase in enrolment in primary schools nationally (MOEST, 2004). A record of 1.3

million children registered in various schools across the country, raising the enrolment from 5.9 million in 2002 to 7.2 million in 2003 (). This sharp increase in enrolment rejuvenated into challenges of FPE in the country (Wamukuru, Kamau and Ocholla., 2006). The PTR steadily increased from the recommended 40:1 to between 60:1 and 90:1 (MOEST, 2004).

In the United States for example, some states have enacted legislation mandating a maximum student–teacher ratio for specific grade levels, particularly kindergarten. When such figures are stated for schools, they often represent averages (means) and thus are vulnerable to skewing. For example, figures may be biased as follows: if one classroom has a 30:1 ratio and another has a 10:1 ratio, the school could thus claim to have a 20:1 ratio overall. In schools, such ratios are indicative of possible staff changes. If the student–teacher ratio is 50:1, the school will probably consider hiring a few teachers. If the ratio is very low, classes could be combined and teachers fired. In extreme cases, the school may close, due to its apparent redundancy. Alan B. Krueger Dustmann, C., et al. (2015).

The developing countries therefore have a dilemma; on one hand they have to endure internal pressure to universalize elementary education and on the other hand, they suffer from serious financial constraints. Across all regions, there are 76 countries that need to enlarge their teaching force. These countries are mostly found in Sub-Saharan Africa, Arab states, South and West Asia.

The reality of teachers trying to teach over 100 pupils become too common in public schools and raised concern about academic standards and therefore questioned the effectiveness of public schools (Abagi & Olweya, 1999). According to Sifuna (2003) free primary education in public primary schools

stretched the teaching and learning facilities as a result of high influx of new pupils. In the year 2007, the performance of pupils in public and private primary schools reflected disparity with private institutions producing more candidates in the top 100 positions nationally compared to public schools in some selected provinces in Kenya.

Kenya has been facing a daunting challenge of increasing PTR due to escalating teacher shortages. The situation grew worse with the introduction of Free Primary Education in 2003. (MOEST, 2004). The Kenyan study revealed that teachers complained of increased pupil-teacher ratios and the increased workloads. The findings of the study also pointed out that many primary schools became understaffed as a result of the FPE programme (Too, 2005). In a study, UNESCO (2005) showed that the average ratio in 162 schools sampled was 58:1 against the required 40:1. Such class sizes in public schools make it difficult for the teachers to teach lessons effectively as compared to their counterparts in private schools who handle a smaller number of pupils.

The recommended PTR for public primary schools in Kenya is 40:1 (TSC, 2006) which is also ideal ratio set by UNESCO and other international standards. This is not the case since the situation is grimmer in arid and semi-arid areas as well as in the slums of urban areas where the ratio is over 100 pupils per teacher. UNICEF (2005). The quality of education in our primary schools was once again brought into focus by the September 2010 teachers strike. KNUT national secretary was quoted saying that schools have continued to post poor results in KCPE with high PTR taking the blame (Daily Nation, 2011:14).

A study in Nyamaiya Division on performance determinants of K.C.S.E found out that teacher adequacy and quality are among the key variables

that predict academic performance in mathematics (Odhiambo, 2006). He pointed out that there is a shortage of mathematics teachers in Kenya but in urban schools, the problem is not as pronounced. He further revealed that the student-teacher ratio in many secondary schools in Kenya is 40:1 and proposed that for effective teaching of mathematics, it should be 25:1 hence recommended the need to employ more mathematics teachers. The study also revealed that high teaching workload led to ill preparation of teachers and students hence lowering performance in national examinations.

This analysis found that not only did small classes improve the chances for academic achievement, but that small classes could also be used as a predictor of student success. Glass and Smith showed that when class size increases, achievement decreases. The results of their investigation suggested that a class size of 15 or fewer would be needed to make a noticeable improvement in classroom performance. Repeated studies provided evidence of important relationships between the number of students in the classrooms and students achievement. This research demonstrated that an appropriate class size was fewer than 20 students, and that the greatest benefits of small classes are obtained in the early grades.

Student Achievement Guarantee in Education (SAGE) is yet another large-scale study conducted in Wisconsin. SAGE was a statewide effort to increase the academic achievement of children living in poverty by reducing the student- teacher ratio in Kindergarten through Grade 3 to 15:1. The program began as a five-year project in 1996-97 school years and tested the hypothesis that smaller classes in Elementary schools raised academic achievement. School districts in Wisconsin that had at least one school with 50% of children or more living below the poverty level were eligible to become a SAGE

school. The program required that participating schools to implement four interventions among them being to reduce the pupil-teacher ratio within a classroom to 15 students per teacher. (Molnar et al ,1999).

Zambia's Education System consists of early childhood education (ECE), primary, secondary and professional or tertiary levels. ECE (pre-school) provides education for children aged 3-6 years while primary level runs from grades 1 to 7 (7-13-year olds) and the secondary level runs from grades 8 to 12 (14-18 years olds). Tertiary education level includes universities and colleges. In addition to the formal system, there is a non-formal education system that operates to serve, among others, displaced persons, school-aged children who have either dropped out of school or have never attended formal school, geographically isolated children, street and working children, as well as adults that want to be literate.

The education system being followed in Zambia is 9 years basis school, 3 years High school and 2 to 4 years tertiary education. One of the biggest challenges in the Zambian Education sector has been the high teacher – pupil ratio. According to UNESCO (2006) the teacher – pupil ratio in the primary sector was at 47.95 as of 2013. Its highest value over the past 43 years was 57.01 in 2006, while its lowest value was 38.19 in 1996.

The primary reason behind lower PTR is that teachers who have fewer students are able to provide each student with more individual attention. Fewer students means that teachers have more manageable workloads and more time to work one-on-one with students; they can engage them more, try out different activities and lessons that might not be feasible in a larger class size, and, because they have

fewer students to monitor, they tend to spend less time on classroom management issues, such as discipline. West & Woessmann (2003)

In Zambia Schools lose more than 12% of their teachers each year due to death, sickness, professional isolation and a lack of social amenities. It is very hard to attract and retain teachers in rural areas – particularly female teachers. Generally, there are only 71,000 teachers, for a total of 3.4 million students which is a ratio of 100:1 (Pupils to teachers). Ministry of Education (2000).

The University of Zambia and all the colleges together train over 2,000 teachers annually; enough to staff 3,700 primary and 600 secondary schools adequately. But the staffing levels in schools are far from satisfactory, because of the high attrition rate of teachers. The Ministry of Education fails to retain its teachers because the conditions of service in the Zambian Teaching Service do not compare favorably with those obtained in other sectors within the country and in the neighboring countries. About 10% of the teachers, therefore, leave the public education system every year. Ministry of Education (2000).

Most of Zambian schools have a higher teacher-pupil ratio as a result the delivery of quality education is affected. Education is important in the social and economic development of individuals, communities and society could not be underscored. An educated individual has the ability to make informed decisions which enables them an opportunity to control and direct development; education is transformational, it is a powerful driver of development.

Molnar et al. (1996-2001), in a well-designed series of five annual evaluations of the Wisconsin SAGE (Student Achievement Guarantee in Education) class size reduction program utilizing a quasi-

experimental design, reproduced the STAR results.<sup>6</sup> With class sizes of 15, they found significant and substantial effect sizes of 0.2 standard deviations, indicating that class size was a very effective school improvement strategy. Gains were greatest for African-American students, and teachers reported better classroom climates and fewer discipline problems.

In recent work (2015), Jackson, Johnson and Persico investigated the effects of school finance reform in 28 states. They followed the infusion of new money between 1970 and 2010, and found that there was a 10% increase in per-pupil spending each year for all 12 years of public school leads to 0.27 more completed years of education, 7.25 percent higher wages, and a 3.67 percentage-point reduction in the annual incidence of adult poverty.

Many studies have been done to assess the impact of class size and pupil-teacher ratio on educational outcomes worldwide. By 1980s, more than 200 studies had appeared on this topic (Hanushek, 1995). Since that time, more sophisticated experiments have confirmed and extended this conclusion (Hanushek, 1995). Among them were, the Tennessee Student-Teacher Achievement Ratio (STAR) experiment, the Student Achievement Guarantee in Education (SAGE) program in Wisconsin, the California Massive Class-size Reduction (CSR) effort, the Project Prime Time in Indiana, the Burke county Project in North Carolina and Federal Initiatives on Reducing Class-size.

Oliver & Said-Moshiro (2007) described that large class size is an inevitable feature of the developing countries. Furthermore, Finn (2003) concluded that the students became occupied in the small class size, both academically and socially. Therefore, their

strong engagement caused academic achievement improved.

Similarly, Lindahl (2005) found the significant effects of smaller class sizes on student achievement. The study examined the effect of class size in natural variation by using longitudinal approach. The teaching and learning process in the developing countries is substandard; this is the key and real issue. However, this process can be improved by enhancing the capability of teachers and school leaders to handle this setting and identifying ways for students to be successful (Benbow, Mizrachi, Oliver & Said-Moshiro (2007).

The evidence suggests that the opposite is true. In STAR, the positive impacts of small classes were found to be larger for experienced teachers.<sup>28</sup> Experienced teachers are better able to take advantage of smaller class sizes to make pedagogical changes.

### III) CHAPTER 3. RESEARCH METHODOLOGY

#### 3.1 Research Design

The survey research design was used in conducting this study. Both the qualitative and quantitative methods was applied in data collection. The questionnaire formed the main part of the research instrument in data collection and where possible structured interviews will be used. According to Creswell (1994), such a design intends to present facts about the nature and status of a situation as it exists at the time of the study. Therefore, the design was helpful in order to describe the current condition and situations based on data collected on PTR and pupil's performance.

## 3.2 Study Population

The population for this study shall comprise of the school Administrators that is the Head teachers and or their Deputies in the selected schools where the study shall be conducted. It will also comprise of teachers and at least pupils from grade 9 classes.

## 3.3 Study Sample

The study sample was a convenient sample comprising of (7) Head teachers or their deputy heads, two (14) teachers and at least two (2) from each selected school and seventy (70) pupils at least ten (10) per school in the selected schools. In addition, one (1) or two (2) officers from the Provincial Administration Office parents will be interviewed for a study sample.

## 3.4 Sampling Procedure

Convenient sampling procedure will be used in coming up with study sample for school managers or their deputy's and systematic random sampling procedure will be used to select teachers and pupils. The reason for this procedure is due to the nature of chosen research site which is Ndola though covering a few selected schools. Only 7 schools will be selected. This restriction is as a result of limited funds.

## 3.5 Procedure for Data Collection

The questionnaires will be distributed to all correspondents by the researcher himself during the time allocated for the research study. Structured interviews will be conducted by the researcher himself with the help of class teachers. Completed questionnaires will be collected by the researcher and or handed in by respondents or participants to the head's office for collection by the researcher.

## 3.7 Triangulation

This research applied different methods of data collection and analysis in order to enrich and confirm the picture the researcher brings out. In this research, the multiple cases within the district supported the validity of the research as it provided valid and practical outcomes as highlighted by Yin (2003). The researcher in this research conducted observation of the operation of UA and a review of service records, in addition to semi-structured interviews. This meant gathering and analysing data from more than one source; thus, accuracy or credibility of the findings was of utmost importance.

## 3.8 Instruments for Data Collection

Questionnaires and structured interviews will be used to collect data from the respondents and participants. The reason behind this is that the researcher intends to uphold confidentiality issues and also minimize researcher biasness in interpreting research findings and maximize the study.

### 3.8.2 Interviews

In this research, the type of interview suitable was semi-structured. This is because semi-structured interview provided the opportunity to probe answers, where the researcher wanted his interviewees to explain, or build on their responses (Saunders et al, 2009). This was extremely important for this research or work because the researcher adopted an interpretivist epistemology. In a semi-structured interview, the researcher asked a series of open-ended questions, with accompanying queries that probed for more detailed and contextual data.

### 3.9.5 Focus Group

This method was used to explore and to discover what a group of respondents might think or feel about the issues surrounding staffing levels. The goal was to provide an opportunity for participants to talk to

one another about this topic. The facilitator was there to guide the discussion but avoided intervening in the discussion.

### 3.9.6 Observation Method

Observation method was also be used in the collection of data. This involved watching and recording the activities of individuals or groups, or the events that occur in the school under study. The researcher undertook an observation in these schools with the view to identifying the factors that contribute to pass or failure rate in some school and not in others. This method was administered because the researcher was be able to collect firsthand information which respondents could not provide and it saved time for the researcher. One of the advantages of using this approach was that the researcher chose when and where to carry out the observation procedure and so ensure that he had a good chance of seeing the people or the behaviour he wished to observe.

### 3.9.7 Document Analysis

Documents such as registers, school establishments and result analyses were analyzed. The biggest advantage of this method was that a large amount of reliable information was obtained without questioning many people. Glenn (2009) contends that in relation to other qualitative research methods, document analysis is less time-consuming and therefore more efficient than other research methods. It requires data selection, instead of data collection.

### 3.10.2 Data Analysis

Data analysis involved the organization and interpretation of all the collected data so as to simplify and present it in the best way possible for easy interpretation and understanding. All data collected from the field was first checked to ascertain completeness. It was then categorized and coded and computed manually. Although this research

generated mostly qualitative data (text, words, opinions, etc.), it also, to some extent generated quantitative data (numbers). In this case, some statistical techniques, such as SPSS were applied to qualitative data that were generated by the quantitative research approach.

### 3.12 Scope of the Study

The research considered the impact of the pupil-teacher ratio on the on the performance of pupils in grade 9 exams from 2013 to 2017. The research will be restricted to the selected schools in the urban area of Ndola. It will be restricted to looking at the extent to which the pupil – teacher ratio contributes to improving the grade 9 examination results.

### 3.13 Limitations of the Study

The following are some of the limitations that are likely to be encountered in this research. These limitations include insufficient time to carry out the research as some respondents may take long to fill in the questionnaires, problems with people in the field and limited financial resources. The research itself will also be a biased accomplishment for the award of the Master's Degree of Education, and, being a case study of the selected schools in Ndola, the study will focus on a small sample size.

## IV) CHAPTER 4: DATA PRESENTATION

### 4.1 Demographic Characteristics.

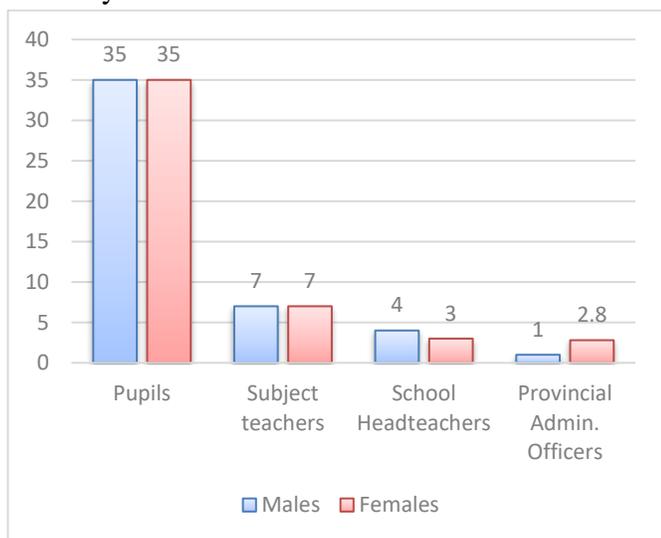
The researcher collected data from 94 participants. Among them were 70 pupils of which 35 were boys and the other 35 were girls. Two 14 teachers (2 from each school) were involved in the study. The Head Teacher were both males and females were 7 and 3 Provincial Officers. The following table shows the distribution of participants by gender.

Table 4.1.

Category	Males	Females	Total
Pupils	35	35	70
Subject Teachers	7	7	14
School Head Teachers	4	3	7
Provincial Administration Officers	1	2	3
Total	47	47	94

**Table 4.1. Distribution of participants by Gender**

**AGE:** The age for the learners ranges between 14 and 18 years.



**Chart 4.2: The age for the learners ranges between 14 and 18 years.**

**Source: Field Data**

As for the teachers and school administrators, their age ranged from 24 to 50 years.

**Table 4.4: Grade 9 Examination Results in English, Mathematics and Integrated Science**

SCHOOL	SUBJECT	YEAR	%
Convent	English	2013	93
	Mathematics	2015	88
	Integrated Science	2017	92
Kalewa Basic School	English	2013	55
	Mathematics	2015	40
	Integrated Science	2017	47
Kansenshi Combined School	English	2013	55
	Mathematics	2015	37
	Integrated Science	2017	43
Northrise Combined School	English	2013	47
	Mathematics	2015	28
	Integrated Science	2017	55
Nsasa	English	2013	79
	Mathematics	2015	70
	Integrated Science	2017	88
Chifubu Secondary School	English	2013	68
	Mathematics	2015	55
	Integrated Science	2017	60

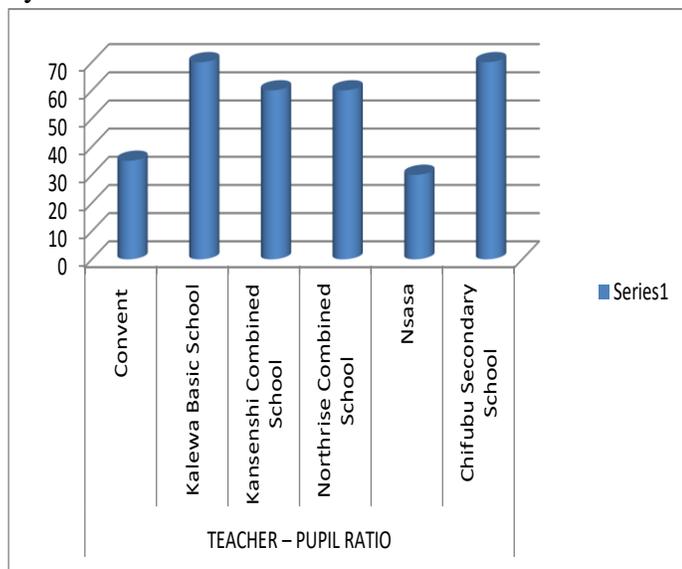
Source: Field Data (2019)

**Table 4.5: Teacher–Pupil ratio for Grade 9 Pupils**

SCHOOL NAME	TEACHER – PUPIL RATIO
Convent	1:35
Kalewa Basic School	1:70
Kansenshi Combined School	1:60
Northrise Combined School	1:60
Nsasa	1:30
Chifubu Secondary School	1:70

**Source: Field Data (2019)**

Figure 4.5: Chart showing the Pupil-Teacher Ratio by School



Field data for 2019

The data collected from the field shows that Government Schools have twice the number of pupils found in Mission and Private Schools.

The data shows that 80% of the pupils are found in Government Schools hence the teacher –pupil ratio is higher for Government schools than that found in Mission and Private Schools.

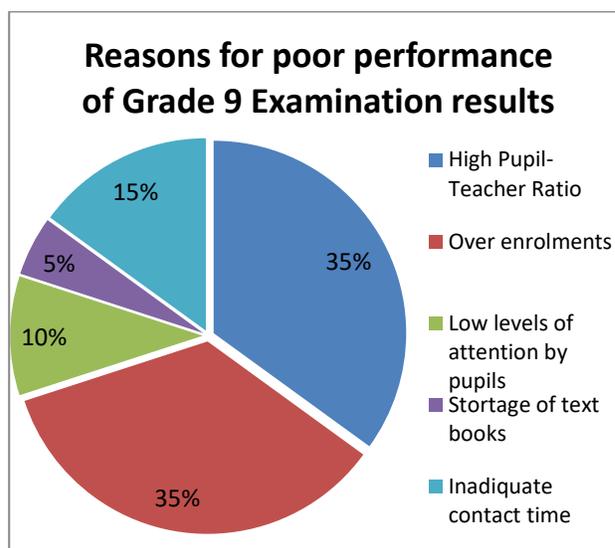
Fig. 4.7: Chart on Grade 9 Exam Results % from 2013 – 2017

SCHOOL NAME	Year	%
Convent	2013	90
	2014	92
	2015	89
	2016	93
	2017	94
Kalewa Basic School	2013	55
	2014	57
	2015	52
	2016	50
	2017	55

Kansenshi School	Combined	2013	58
		2014	55
		2015	56
		2016	50
		2017	61
Northrise School	Combined	2013	54
		2014	55
		2015	53
		2016	58
		2017	60
Nsansa		2013	89
		2014	92
		2015	94
		2016	90
		2017	93
Chifubu School	Secondary	2013	54
		2014	52
		2015	64
		2016	66
		2017	72

The data collected from the field shows that government schools obtained lower percentages the examination results.

#### 4.8: Reasons for poor performance of Grade 9 Examination Results



The data collected from the field showed that most government schools had high pupil-teacher ratio, over enrolled classes; as a result, most of the pupils expressed low levels of attention. The other reason that could be attributed to poor grade 9 examination results was shortage of text books as well as inadequate contact time by the teacher due to huge classes.

Assessment of the impact of PTR on pupil's performance was the key objective of this study. The Table 3.1 indicated that since 2014 the average scores of pupils in the sampled schools were below the average score of 300 marks. This study revealed that teachers teach more lessons than recommended. In most schools it was found that teachers in most public schools teach all the lessons planed for each week. This is a clear indication that such teachers are over loaded in their teaching assignments.

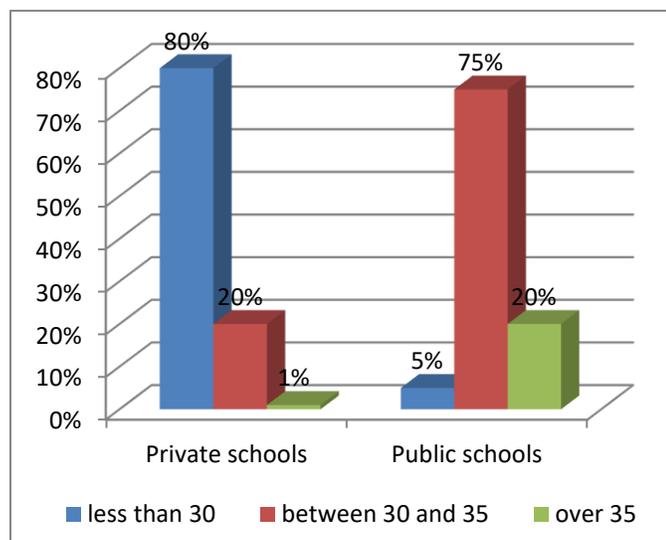


Figure 4.9: Teacher teaching load (Field data 2019)

Figure 3.2 shows that 75% of public schools have teachers teaching 30-35 lessons per week while private schools only have 20%.

The study revealed that the largest percentages of schools have PTR of between 55:1 and 65:1, which is far above the set standards of 40:1. Most respondents of this study agreed that attaining ideal PTR is one of the major challenges schools face and which affects performance. Hanushek (1999)

## V) CHAPTER 5: DISCUSSION AND INTERPRETATION OF FINDINGS

Pupils and Teachers in the selected schools fully participated in the research survey. Data collected shows that Mission and Private schools have better staffing levels as compared to Government schools. As a result, the well-staffed schools perform better academically. Most Government schools have staff shortages as well as inadequate infrastructure at all levels of our education system.

The consequences of the current high pupil-teacher ratio include low levels of attention to individual pupils (clearly disadvantaging the 'slow learners'), a high possibility of transmitting contagious diseases, shortage of text books and other learning materials, inability to effectively carry out practical lessons, lack of attention by pupils because of distractions from the many classmates and many more. .

In terms of pupil-teacher ratio table 5.3 and 5.4 show that Government schools have the highest teacher – pupil ratios and as such there is inadequate contact time between pupils and teachers. This affects the pupils negatively especially the slow learners. The teacher will prepare and deliver the lesson and will not be able to give individual attention to all the learners due to the workload. They have to teach, give an exercise and mark all the books by the end of the day.

In terms of classes that each grade has per school is different. Mission and Private schools usually have One (1) to Three (3) classes of each grade while the scenario is very different at Government schools. On average government schools have between Four (4) and Ten (10) classes of each grade. Due to the high number of pupils and shortage of staff, teacher in most Government schools have to teach more than 4 classes per subject.

Results from the interviews with the teachers and pupils revealed that pupil-teacher ratio has a great impact on the performance of grade 9 examination results. To alleviate the poor pupil-teacher ratio in government schools, they suggested the need for government to build more schools, employ more teachers, buy more books as well as motivating of the teachers so that they are maintained in the teaching profession.

Findings from the study show that there is significant relationship between teacher- student ratio and academic achievement of students. This finding was supported by Bayo (2005) who opined that smaller classes benefit all pupils because of individual attention from teachers, but low-attaining pupils benefit more at the secondary school level. Pupils in large classes drift off task because of too much instruction from the teacher to the whole class instead of individual attention, and low-attaining students are most affected.

Furthermore, Finn (2003) concluded that the students became occupied in the small class size, both academically and socially. Therefore, their strong engagement caused academic achievement improvement. Findings from study also revealed that there is a significant relationship between teacher's years of experience and academic achievement of students. This finding was supported according to

Oriaife in Maduewesi (2005), quality assurance is a baseline standard in education which can be measured on a scale of reference. It is an expression of standard or a means by which a certain set standard in education can be achieved.

It could easily be deduced therefore that quality assurance in education is a totality of the combination of such indispensable variables as quality teachers, teacher's years of experience, quality instructional materials and quality infrastructure (classrooms, seats, tables, chalkboards etc.). Others include; favorable teacher/pupils' ratio, favorable pupils/classroom ratio and quality instructional supervision. All these and more surely results to quality product (student) who is exposed to a balanced and result oriented education, especially secondary education. He is well prepared to face not just the challenges of tertiary education, but the challenge of providing middle level technical and administrative service in any sector of the economy.

This finding collaborates with NPE (2007) that no educational system can rise beyond the quality of its teachers. There is also a significant relationship in quantity and quality of teachers and students' academic performance. Therefore, in order to find solution to the problems hindering effective functioning of secondary education, a look must be taken at the quality of teacher interaction and delivery. Situations where some teachers are not masters of the subject they teach, cannot communicate effectively, show dedication and commitment to duty do not augur well for education.

## **Conclusion**

The importance of good pupil-teacher ratio in the education cannot be over emphasized. If the education sector is to improve and produce quality people in society, then each and every school must

have reasonable pupil-teacher ratios. Much has been said and written about the falling standards of education in this country and several reasons have been suggested for this, among which are poor teacher motivation, insufficient school infrastructure (especially in rural areas), inadequate teaching and learning materials.

Other factors that have a bearing on education standards include: unmanageable workloads: Because of the shortage of teachers in most schools, especially in high schools, the few that are in employment handle so many classes that it is practically impossible to prepare adequately for each lesson, let alone correct pupils class exercises or homework. Subjects which have a practical component are severely compromised because there is hardly time or resources to conduct meaningful experiments or practical exercises.

The study found out that PTR have statistically significant effect on pupil's performance in examination classes. Results derived from the analysis indicates that there exists enough evidence to conclude that the slope of the population regression line is not zero and that PTR is a significant predictor of pupil's performance. This research study demonstrated that a decline in PTR increases overall performance of pupils in public schools. The analysis therefore partially supported by the findings regarding PTR and performance indicate that there is a relationship between the two variables of the study. It is therefore important that the number of pupils per teacher should be taken into consideration by the government and other education sector stakeholders in formulating policies in the schools. For better academic performance, great attention should be placed on PTR.

## Recommendations

Arising from the findings, the challenge of teaching in large classes should not be left to school administrators and teachers alone but should be faced at all fronts by all stakeholders. It is for this reason that based on the findings of the study and the discussion thereof, the following recommendations were made:

The Ministry of General Education should consider introducing team teaching in order to ease some of the challenges faced by teachers of large classes. The Government must foster community participation and investment in the education section in order to increase the number of schools in the country. The Government must set up deliberate policies to motivate teachers so that they do not leave the teaching profession especially after they have upgraded their studies to join other professions. The Government should expand a sustainable financial resource base in order to develop, revise and improve the overall framework for quality educational planning, human resource, financial management and administration. The government should increase its staff development in the education sector each year and should quickly replace teachers who resign or die so that staffing levels do not drop but improve each year. Great attention should be placed on PTR. The impact of PTR also goes beyond its effects on performance but also pupils' discipline and teacher motivations. Much of the case for low PTR rests on common sense arguments, but this research has now documented the benefit of attaining ideal PTR. With low PTR, teachers can devote more attention to pupils' needs.

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