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A Comparative Analysis on the Quality of Primary Education in Schools under Public Private Partnership Model in Kilimanjaro Region, Tanzania

Paulin Paul

Assistant Lecturer, Department of Community and Rural Development,
Moshi Co-operative University, Tanzania

Kim A. Kayunze

Associate Professor, Department of Development Studies,
Sokoine University of Agriculture, Tanzania

Abstract:

The Government of Tanzania started using the Public-Private-Partnership (PPP) model for provision of education services from the late 1970s, and in the mid of 1990s there was an increased participation of private partners in the provision of such services at all levels. Therefore, it was anticipated that the quality of education would have improved substantially in terms of teaching and learning (T/L) infrastructure, T/L materials and pupils' academic performance in national examinations. However, the quality of primary education in schools under PPP is not scientifically known. Therefore, the research on which this paper is based, among other things, identified and PPP schools and private primary schools in Kilimanjaro Region as a case study in Tanzania. Data were collected by using a questionnaire which included an index summated scale, an FGD guide and a key informant interview guide. Observation method was also employed in collecting data. A total of 240 pupils and 60 teachers were selected. The results showed that public schools not under PPP had more insufficiency of school T/L infrastructure and T/L materials compared to their counterpart public schools under PPP and private schools, the highest quality being in private schools. Since school infrastructures and T/L materials were indicators of quality education, it is concluded that the quality of education in PPP schools was intermediate while the quality was the best and poorest in private and public schools respectively. It is also concluded that inadequate school infrastructure and T/L materials is associated with ineffective teaching and learning process for teachers and pupils in classroom hence poor quality of education. Also, schools with PPP interventions have a better chance of improving the quality of education compared to schools without PPP. It is recommended that the Education Department in Kilimanjaro Region should administer and put in practice an education policy that requires every pupil and every school to be sufficiently provided with required number of school T/L infrastructure and T/L materials. This will be possible if local authorities of the studied districts will team up and collaborate closely with private educational partners.

Keywords: Quality education, primary schools, PPP model, Kilimanjaro, Tanzania

1. Introduction

The private sector has been involved in the delivery of public services such as health, water, housing and transport in both developed and developing countries. Currently, it is difficult to find a county of the world where the public private partnership (PPP) model has not been used (Blacke, 2004). From the mid-19th century, there has been an expansion on the use of the private sector's role in the provision of public services in many developing countries (Farah and Rivzi, 2007). The main driving forces that make many governments in the world to collaborate with the private sector through the PPP model are to share risks, attract private capital investment, increase efficient use of available resources and improve the provision of quality public services to many people (Brenck, 2011).

An increasing call for the practice of PPP in Africa has been fuelled, on one hand, by conscious policy design and inefficiency of the public sector to provide quality services to all people. Voluntary demand-driven factors of private partners based on increased need and access to quality social services have also imposed its use (Heather and Kathleen, 2007). In the education sector, the PPP model is more important particularly when the public sector alone does not have enough capacity to deliver public services effectively and efficiently to all people.

Education studies on the PPP model which were conducted in many parts of the middle economy countries, particularly in Northern Brazil and India found that the use of the PPP model in the education sector has led to significant improvement in the quality of education at all levels (URT, 2009). The use of the PPP model has improved and made school environment more conducive for learning through construction of school infrastructure, provision of teaching and learning materials and support of other educational services hence good academic performance among pupil (Bellei, 2005). Also, Itika (2007) argues that most of the developed countries in the world have relied heavily on the PPP model for provision of quality services to their people; hence such partnership is instrumental to any country's development.

In line with the Dakar educational conference as well as the second and eighth Millennium Development Goals (MDGs), many Sub-Saharan African governments were advised to adopt the PPP model in order to achieve Universal Primary Education in order to increase access to good quality of education. The Government of Tanzania adopted the use of the PPP model for service delivery particularly in education from the late 1970s, and in the mid-1990s there was an increased participation of private partners in the provision of education services at all levels. Through the use of the PPP model, it was anticipated that the quality of education would be improved in Tanzania by fulfilling the set standards for good quality of education.

In Tanzania, the private sector collaborates with and supports the government in education by construction and renovation of school infrastructure as well as provision of teaching and learning materials (URT, 2006). Furthermore, the private sector supports other educational services such as nutritional programmes, water, play grounds and school fencing through joint ventures (TEN, 2011). Regardless of the adoption and long use of PPP model for fostering socio-economic development through improving of education services in Tanzania, the quality of education in PPP schools is not substantially improving. Studies by Mpamila (2007) and Lwaitama (2008) revealed that the scarcity of instructional materials as well as shortage and poor school environments still appeared as the most serious impediments to quality of education in most of primary schools in Tanzania. The situation was evidenced by poor teaching and learning environments, low ratio of instructional materials, few school infrastructure and poor academic performance in national exams. A basic education statistics report of 2012 shows imbalance of school infrastructures particularly classrooms and toilet holes against the available number of pupils. For example, the report showed that Kilimanjaro Region had a desks shortage of only 17.2% compared to a shortage 85.1% in Mtwara. Also, the statistics in that report indicate insufficient number of teaching materials (textbooks) in most of primary schools in Tanzania (URT, 2014a). A study by TEN (2011) found that more than 85 pupils were studying in one classroom while four to five of them were sitting on one desk and sharing one textbook of Mathematics instead of one to three pupils sitting on one desk and every one having their own books of not only Mathematics but also of other subjects. With regard to such disproportional ratios of desks and textbooks to students, it was noticed that there was a slow decrease in academic performance in the standard seven national examinations in the country from 54% in 2007 to 31% in 2012, and it was thought to be associated with this situation. Also, the knowledge and skills among primary school leavers was found to be low compared to the education level they had reached (URT, 2014a). The overarching question for this study was that, "do poor qualities of education (disproportional school infrastructures and learning materials) also exist in primary schools that get educational support from private development partners?"

Vespoor (2008) argues that few studies which have been done on assessing the quality of education in sub-Saharan Africa have not taken in consideration the holistic model of PPP. Also, a study by TEN (2011) recommended specifying the quality of education in schools that were collaborating with private educational partners in the country. This precipitated the need for this study to examine the quality of education in public schools under PPP in comparison with public schools not under PPP and private schools. Specifically, the objectives of this manuscript were to: (i) assess the availability of teaching and learning infrastructure in public primary schools under PPP, public primary schools not under PPP and private primary schools; and (ii) examine the availability of teaching and learning materials in the same schools.

2. Methodology

The study was conducted in Moshi District Council and Moshi Municipality. From each of the two authorities (Moshi District Council and Moshi Municipality) fifteen primary schools were selected randomly making a total of thirty primary schools (16 public PPP, 8 public schools not under PPP and 6 private) for the study. From each selected school, two (2) teachers were randomly selected, making a total of 60 teachers from all schools. Also, eight (8) pupils were randomly selected from two classes of the surveyed schools (4 Standard IV and 4 Standard VII), giving a total of 240 pupils. Seven (7) parents having pupil(s) studying in a particular school and four (4) school committee members from each of the schools were selected and involved in focus group discussions. Ward Education Coordinators, District and Municipal Education Officers were used as key informants.

In this manuscript quality of education was measured based on two dimensions: level of availability of school infrastructure and level of availability of teaching-learning materials, based on the ratios set by the Ministry of Education, Science, Technology and Vocational Training. In measuring learning environments, the study assessed the availability of school infrastructure by focusing on level of availability of classrooms, toilets, teachers' houses, modern kitchens, dining hall and availability of water service. Availability of enough teaching and learning materials in each subject studied was assessed based on textbooks in every subject, mathematical set, exercise books, pen and pencil. These two elements (school infrastructure and T/L materials) which denote quality education were measured by using a questionnaire for structured interviews which

included two index summated scales to determine the level of availability of school infrastructure and of teaching and learning materials. Nine statements based on school infrastructures were constructed on which the respondents scored a minimum of 0 and a maximum of 11 points. On the scale, scores ranging from 0 to 5.9 denoted insufficient T/L infrastructure while scores ranging from 6.0 to 11 denoted sufficient T/L infrastructure. Also, thirteen statements based on teaching-learning materials were constructed on which the respondents scored a minimum of 0 and a maximum of 13 points. On the scale, scores ranging from 0 to 6.9 denoted insufficient T/L materials while scores ranging from 7.0 to 13 denoted sufficient teaching-learning materials. In this paper sufficient availability of school infrastructure and T/L materials were considered as independent variables that influenced and determined pupils/school academic performance (dependent variable), which was measured in terms of pupils' competency in literacy and numeracy based on their studying class and schools'/pupils' academic performance in standard seven national examinations.

Primary quantitative data were collected through structured interviews using a questionnaire while a focus group discussion guide and an interview guide were used to collect qualitative data. Observation method was also employed to verify physical availability of school infrastructure, facilities as well as teaching and learning materials and their user ratios. Pupils and teachers were the units of observation while a school and pupils were units of analysis. Data were analyzed using the IBM SPSS Statistics software and Excel. The descriptive statistics that were computed were frequencies, percentages, arithmetic means, and standard deviations of individual variables. Moreover, inferential analysis was done by using One-Way ANOVA to compare the quality of education on the assessed school infrastructure and T/L materials to public, private and PPP school categories. Five per cent (5%) was the significant level cut-point which was adopted for comparing the points scored on quality of education. Content analysis was used to analyse qualitative information from FGDs and key informants interviews by summarizing their views, feelings and arguments. The transcribed themes and concepts were compared and discussed in comparison with empirical information.

3. Results and Discussion

3.1. Socio-Demographic Characteristics of the Respondents

The socio-demographic factors that were analysed in this manuscript included age, sex, education and class level, marital status and total number of pupils and teachers in a school.

The findings in Table 1 show that the minimum and maximum ages for the pupils were 8 and 18 years respectively while for teachers the minimum age was 22 years and the maximum age was 67 years. The majority of pupils (51.7%) were in the age group of 8 - 12 years with a standard deviation of 1.9 years, indicating that there were slight differences in age among pupils across classes. Also, the majority of teachers (45.0%) were in the age group of 38 - 53 with a standard deviation of 10.5 years. This indicates that there was a big difference in age among teachers in the studied schools. The findings revealed that school categories (public PPP, public non-PPP and private) were the main reason for this situation as some of private schools were found to employ retired teachers from public PPP and public non-PPP schools. The average age pupils in public PPP schools was younger compared to ages pupils non-PPP public schools and in private schools. Conducive environment in PPP and private schools was the main factor that led to this situation.

With regard to sex, the results in Table 1 show that, out of the 240 interviewed pupils, 48.8% were male and 51.2% were female, while 43.3% and 56.7% of the 60 teachers who were interviewed were male and female respectively. This indicates that there was a slight difference in gender parity among pupils while high gender parity existed among teachers. Furthermore, the study found that female teachers were in high positions in the studied schools.

Sex	Pupils	Per cent	Teachers	Per cent	Std. Deviation
Male	117	48.8	26	43.3	-
Female	123	51.3	34	56.7	-
Total	240	100.0	60	100.0	-
Age	n	Minimum	Maximum	Mean	
Pupils	240	8	18	12.05	1.934
Teachers	60	22	67	47.40	10.454

Table 1: Age and Sex of the Respondents

Source: Authors' Survey

About education level of teachers, the study findings indicated that most of the studied schools were staffed with teachers who had certificates in education; 56.7% of the interviewed teachers had attained certificate in education and 15.0% had attained first degree in education. Parker (2004) revealed that high education level among teachers is an important factor for a good mix of subject matter knowledge and pedagogic content for provision of quality education and effective delivery of lessons. Also, the results showed a slight difference in teachers' education level among the three school categories surveyed (Table 2). Chi-Square test found a significant association between school categories and teachers' education level (Chi-Square = 21.469, $p < 0.05$). Private schools were found to have teachers with higher levels of education compared to their counterparts; this was caused by better salaries and other fringe benefits provided in private schools.

School Category	Education Level of Teachers						Total (%)
	Primary Education Only (%)	Form Four Only (%)	Form Six (%)	Certificate In Education (%)	Diploma In Education (%)	Degree In Education (%)	
Public	14.3	14.3	0.0	50.0	7.1	14.3	100.0
Private	0.0	0.0	0.0	42.9	35.7	21.4	100.0
PPP	0.0	0.0	9.4	65.6	12.5	12.5	100.0
Total	3.3	3.3	5.0	56.7	16.7	15.0	100.0

Table 2: School Category and Education Level of Teachers (N = 60)
Pearson Chi-Square = 21.469, P = 0.018; Source: Authors' Survey

3.2. Total Number of Teachers and Pupils

The study findings showed that there were difference in the numbers of teachers and pupils at the school categories studied. There was a minimum number of 57, a maximum of 1,069 and a mean of 523.6 pupils per school, while the minimum number of teachers was 4; the maximum was 27 and the mean was 16.0 per school in all the studied schools. PPP schools were found to have the fewest teachers compared to their counterpart public and private schools. Table 3 shows variation of pupil teacher ratio (PTR) from 19.9:1 in private schools to 31.4:1 in public schools and to 38.4:1 in PPP schools. The variation of PTR among those school categories was statistically significant ($F = 12.732$, $p = 0.000$). Furthermore, PPP schools were found to have the fewest teachers compared to their counterpart public and private schools. This situation was caused by high enrolment rate due to good teaching and learning environments in this category of schools. During key informant interview a head teacher at Benjamini Mkapa Primary School said that:

Some of the parents from various areas around this village are lobbying strategically for their children to be transferred to this school due to having more conducive environment for teaching and learning.

Groups Compared	N	Mean Of PTR	Between And Within Groups	Sum of Squares	Df	Mean Square	F	P-Value
Public School	14	31.4275	Between Groups	3357.052	2	1678.526	12.732	0.000
Private school	14	19.9282	Within Groups	7514.589	57	131.835	-	-
PPP school	32	38.4379	-	-		-	-	-
Total	60	32.4832	-	10871.641	59	-	-	-

Table 3: One-Way ANOVA Comparing Pupil: Teacher Ratio by School Category
Source: Authors' Survey

The one-way ANOVA results in Table 3 show that PPP schools had the biggest PTR while private schools had the lowest PTR. It also shows that the PTRs in the three categories of school were statistically significant different ($F = 12.732$, $p < 0.05$). This existing situation is not good since it affects the processes of teaching and learning in classroom, hence poor academic performance among pupils.

3.3. Availability of School Teaching and Learning Infrastructure

Sufficient availability of classrooms, desks, houses for teachers, pupils' toilet holes, modern kitchens, modern dining halls as well as availability and type of water sources determine the quality of education in a given society. Sufficient availability of teaching and learning infrastructure was determined by using an index summated scale. The results in Table 4 show that 55.0% of teachers held the opinion that their schools had insufficient infrastructure while 45.0% said that their schools had sufficient T/L infrastructure. Private schools were found to have more school infrastructure compared to their counterpart PPP schools. Public schools were found to have high scarcity of all school infrastructures. The variation was statistically significant (Chi-Square = 3.568, $p < 0.05$). Shortage of financial resource has made the government unable to provide sufficient needed school infrastructure to all public schools. Good situation in PPP schools was influenced by private educational partners. Gibson and Davies (2008), in their study on factors influencing quality education, revealed that sufficient availability of school infrastructure is among crucial factors that influence quality of education. The status of each type of school infrastructure that was assessed is described in the following subtopics.

School Category	Status of School Infrastructure		Total
	Insufficiency of School T/L Infrastructures (N, %)	Sufficiency of School T/L Infrastructures (N, %)	
Public School	14 (100.0)	0 (0.0)	14 (100.0)
Private school	2 (14.3)	12 (85.7)	14 (100.0)
PPP school	17 (53.1)	15 (46.9)	32 (100.0)
Total	33 (55.0)	27 (45.0)	60 (100.0)

Table 4: Index Summated Scale on Whether the School Is Sufficiency with T/L Infrastructures (N = 60)

Pearson Chi-Square = 20.877, P = 0.000; Source: Authors' Survey

3.3.1. Classroom Availability

The study findings showed that all of the surveyed primary schools were supposed to have 1,511 classrooms in order to have the recommended ratio pupils: classroom ratio (PCR) of 45:1, but there were only 1016 classrooms with a shortage of 495 classrooms. Furthermore, the study findings showed that, in all the surveyed schools, the minimum pupils' classroom ratio (PCR) was 7, while the maximum was 93, and the mean was 46.17 PCR. Sufficient number of classrooms in a school was accepted as part of the fundamental elements that influence effective teaching and learning environment hence good quality of education. This factor determines the directed standard class size and hence leads to effective teaching and learning at classroom level (Gibson and Davies, 2008).

The results showed that, on average, private schools had a PCR of 27.24, followed by public schools (44.31) while PPP schools had a PCR of 55.26. This indicates that most of private and public schools in Kilimanjaro Region adhere to the set standard by the Ministry of Education, Science, Technology and Vocational Training (MoESTVT) policy that advocates a ratio of 45 pupils per one classroom at the primary school level, except PPP schools (URT, 2006). Most of PPP schools were found with high concentration of pupils; hence the study revealed that high PCR in PPP schools was caused by conducive environment that attracted many pupils to be enrolled. So, the better the school teaching and learning environment was, the higher was the PCR. Moreover, the study findings showed that the status of classrooms in public schools was in very bad conditions (not well cemented, leaking roofs and too old classrooms that needed urgent renovations) compared to that of PPP and private schools categories. This finding concurs with arguments by Newmann and Sconzert (2009) who asserted that quality of school infrastructure influences learners' attendance to school hence quality education.

3.3.2. Availability of Desks

The study showed that many of the surveyed schools (28) used two sitters type of desks and two private schools were using only one sitter desk (table-chair). During the survey it was observed that some few schools used both types of desks and tables-chairs. The Ministry of Education, Science, Technology and Vocational Training (MoESTVT) policy advocates three categories of pupil desk ratio that determine types and size of desk to be used by pupils; that is; three sitters, two sitters and one sitter.

The study results show that for the surveyed primary schools in order to be desk sufficient they were supposed to have 27,130 desks of two sitters, but there were only 12,016 desks, with a deficit of 15,114 desks. Furthermore, the findings indicated that there was a very high pupil: desk ratio (PDR) of 7.1: 1 and an average of 2.6: 1 PDR in all the surveyed schools. The study revealed that this undesirable situation was adopted to cope with insufficiency of desks. Sufficient numbers of desks in a school is also accepted as an essential element that influences effective teaching and learning environment in the classroom hence good quality of education. This factor also determines the set pupils: desk ratio, which leads to effective teaching and learning at classroom level (Gibson and Davies, 2008). The results in Table 5 show that private schools had the best PDR, with an average of 1.8, followed by PPP schools (2.7 PDR). One-way ANOVA found this variation to be significantly different statistically ($F = 4.857$, $p < 0.05$) among the three categories of primary schools. This finding verified the significant roles played by private educational partners in improving the quality of primary schools in Kilimanjaro Region as private and PPP schools were found to operate under the set PDR.

Groups Compared	N	Mean of School PDR	Between and Within Groups	Sum of Squares	Df	Mean Square	F	P-Value
Public School	14	2.8	Between Groups	11.330	2	5.665	4.857	0.011
Private school	14	1.8	Within Groups	66.488	57	1.166	-	-
PPP school	32	2.7	-	-	-	-	-	-
Total	60	2.537	Total	77.818	59	-	-	-

Table 5: One-Way ANOVA Comparing Pupil Desk Ratio (PDR) and Schools Categories

Source: Authors' Survey

The results also showed that 71.4% of the observed desks were found in good conditions but 24.1% were in poor condition. Public schools were leading by having desks that were in poor conditions (not strong enough, broken and not in

use) compared to desks in the private and PPP schools category. This situation signifies the considerable roles played by private partners in the education sector.

3.3.3. Availability of Toilet Holes for Pupils

The study findings showed that 196 pupils (82.7%) out of 240 said that their schools did not have enough toilet holes for boys and girls while 44 pupils (18.3%) reported that their schools had enough toilet holes to use. The minimum toilet holes user ratio for boys was 6.7 and the maximum was 144 while the minimum toilet holes user ratio for girls was 7.5, and the maximum was 125 (Table 6). This result indicates a serious shortage of toilet holes for boys and girls and indicates poor environment that does not favour provision of quality education in the studied schools. Sufficient availability of toilet holes for girls and boys is one of the key input indicators used as a measure of quality education in line with the Education Strategic Plan (ESP). In regard to this, the Ministry of Education, Science, Technology and Vocational Training in Tanzania stipulates the optimum user ratio of 20 boys and 25 girls for one toilet hole (URT, 2006).

Toilet Holes User Ratio	Minimum	Maximum	Mean	Std. Deviation
User ratio for boy	6.75	144.00	44.8121	34.43884
User ratio for girls	7.50	125.00	36.6627	25.32449

Table 6: School Toilet Hole User Ratio for Boys and Girls (N = 58)

Source: Authors' Survey

Table 7 shows that public and PPP schools categories had serious shortages of toilet holes for boys with a user ratio of 49.9 (public) and 50.2 (PPP) compared to their counterpart private schools (28.2). Also, the results in Table 7 show that PPP and public schools categories had serious shortage of toilet holes for girls, with a user ratio of 37.9 (PPP) and 47.6 (public) compared to their counterpart private schools (24.6). Schools with conducive environment for pupils play a strong base for pupils to participate in learning process. Availability of enough toilet holes for boys and girls at school makes pupils feel free in attending school hence improve their participation in the learning process at the classroom level (Hansen, 2000).

In assessing the types and statuses of the toilet used, 53.3% of the pupils said that they used modern (flush) toilets while 46.7% reported to use traditional/pit latrines. Out of the thirty primary schools surveyed, only one primary school (Himo-Pofo, in Moshi Rural District) was found to have no toilet for pupils. The head teacher reported that pupils in his school used toilets from a neighbouring primary school located at a distance of about 150 metres.

Groups Compared	N	Mean User Ratio For Boys	Mean User Ratio For Girls	Sum Of Squares	Df	Mean Square	F	P-Value
Public School	12	49.9	47.6	5099.857	2	2549.929	2.244	0.116
Private school	14	28.2	24.6	62504.076	55	1136.438		
PPP school	32	50.2	37.9					
Total	58	44.8	36.7	67603.933	57	3505.916	2.917	0.062
				36555.806	57	33049.891		

Table 7: One Way –ANOVA Comparing Toilet Holes User Ratio for Boys and Girls and

School Types and (N=58)

Source: Authors' Survey

3.3.4. Houses for Teachers

The results showed that most of the studied schools had insufficiency of houses for teachers. The studied primary schools were supposed to have 918 houses for teachers, but there were only 86 houses, with a deficit of 832 houses while the maximum teachers: house ratio was 24. Private schools were found to be in the worst situation of not having enough houses for teachers, with a mean of 13.1 teachers: house ratio compared to PPP schools (12.2, THR) and 9.8 THR for public schools. These findings imply that most of the teachers were living outside schools and far from their working schools, hence arriving late for classes and sometimes not attending to school at all. These results are in line with findings of a study by Yvonne and Kola (2013) who reported that when employees live far from their work places, the situation can lead to poor job performance hence poor or low attainment of the desired goals. This implies that availability of sufficient number of staff houses is among the pre-requisites for quality education, and this influences effective teaching and learning among pupils and teachers respectively.

Also, the results showed that 75.0% of the surveyed schools' houses were in good conditions; 15% were in poor condition and 10% were still in construction (incomplete). The quality of houses in public schools was in very bad conditions (not well cemented, leaking roofs and being very old needing urgent renovation) while houses in private and PPP school

categories were generally in good condition. These findings indicate that collaboration between public and private partners had much assisted to renovate and construct houses for teachers hence improved the quality of primary education.

3.3.5. Availability of Modern Kitchen

The vast majority (85.8%) of the studied primary schools provided food to their pupils, but 14.2% did not offer food to their pupils. The results in Table 8 show that 67.1% of the surveyed schools had modern kitchens but 32.9% had no modern kitchen. PPP schools were found to have and use more of the modern kitchens, followed by private schools while public schools were found to use more of the traditional kitchens that needed a lot of energy and were more time consuming. These findings are not surprising since they are in line with findings of a study by Jyoti et al. (2005) who found that modern kitchens that utilize and use small energy do influence and contribute to the process of improving quality of education at all school levels. These results indicate that the quality of education in the public schools was in doubt due to lack of food service to most of those schools. Also, few of public schools that offered food to pupils used traditional kitchens, a situation which led to ineffective teaching and learning processes to both teachers and pupils.

School Category	Whether The School Has Modern Kitchen					
	Yes		No		Total	
	n	%	n	%	n	%
Public	8	14.3	48	85.7	56	100
Private	41	73.2	15	26.8	56	100
PPP	112	87.5	16	12.5	128	100
Total	161	67.1	79	32.9	240	100

Table 8: Availability of Modern Kitchens in the Studied Schools (N=240)

Pearson Chi-Square = 95.881, P = 0.000

3.3.6. Availability of Dining Halls at School

Findings on the availability of school dining hall showed that 26.7% of the surveyed schools had special places for pupils to get food, while 73.3% of the schools did not have such places (Table 9). These findings are comparable to those of a study by Patrinos and Sosale (2007) who found that safe and health places for getting food should be observed in any learning institution so as to maintain hygiene to learners, hence effective teaching and learning. The problem of not having dining halls was more seen in public and PPP schools. These results reveal that most of the primary schools which were offering food to pupils did not have dining halls; instead pupils used any place for getting food, a situation which indirectly threatened their learning.

School Category	Counts and Per Cents	Whether the School Has a Dining Hall		Total
		Yes	No	
Public	Count	1	55	56
	%	1.8	98.2	100.0
Private	Count	41	15	56
	%	73.2	26.8	100.0
PPP	Count	22	106	128
	%	17.2	82.8	100.0
Total	Count	64	176	240
	%	26.7	73.3	100.0

Table 91: Whether the School Has Dining Hall (N=240)

Pearson Chi-Square = 85.655, P = 0.000; Source: Authors' Survey

3.3.7. Availability of Water Service at School

The results on the availability of water services showed that 93.8% of the surveyed schools had water service around their school compounds and only 6.2% had no water service around. Public schools were the most schools found not to have water sources around school compounds. More than a half (54.3%) of pupils mentioned tap water as the major source of water at their schools, while 2.6% indicated water open canals as their source of water (Table 10). This result indicates that pupils in public schools wasted a lot of time on fetching water from far distances of about 750 metres. The study revealed that availability of water service at school compound influenced effective teaching and learning between teachers and pupils thus improved quality of education.

Type of Water Source At School	Responses	
	Responses	Per cent
Tap water	186	54.3
Tank water	106	31
Open canal	9	2.6
Well water	41	12.1
Total	342	100

Table 10: Pupils' Multiple Responses on the Type of Water Sources at School (N=240)

240 Pupils' Gave 342 Responses

Source: Authors' Survey

3.4 Availability of Teaching and Learning Materials in Public, Private and PPP Primary Schools

An index summated scale was used to determine level of availability of teaching-learning materials; the result on this showed that 54.6% of the interviewed pupils were found to have insufficient teaching-learning materials, while 45.4% had sufficient teaching-learning materials (Table 11). The problem of pupils and or schools having insufficient teaching-learning materials existed more in public and PPP schools compared to their counterpart private schools. The association was statistically significant (Chi-Square = 50.114, $p < 0.05$). These results are contrary to findings of a study by Gibson and Davies (2008) who reported that sufficient availability of teaching-learning materials was among of the crucial factors that influence quality of education. The status of the availability of teaching-learning materials that were assessed is described in the subsequent subsections.

School Category	Counts and Per Cents	Whether the School Has Sufficient T/L Materials		Total
		Sufficiency	Insufficiency	
Public	Count	11	45	56
	%	19.6	80.4	100.0
Private	Count	47	9	56
	%	83.9	16.1	100.0
PPP	Count	51	77	128
	%	39.8	60.2	100.0
Total	Count	109	131	240
	%	45.4	54.6	100.0

Table 11: Whether the Schools Had Sufficient with Teaching and Learning Materials (N = 240)

Pearson Chi-Square = 50.114, $P = 0.000$; Source: Authors' Survey

3.4.1. Availability of Subject Text Books

The study findings showed that, out of the thirty primary schools surveyed, only two private schools (Mt. Kilimanjaro and Imani pre- and primary schools) managed to provide a copy of a textbook to every pupil in each subject studied (1:1 PTBR). This result shows that there was serious shortage of textbooks, particularly in public and PPP schools. Pupil Text Book Ratios (PTBR) for Mathematics and English subjects were below five while for other subjects there were lower PTBR of above ten. Vocational skills and Personality development & Sports subjects had a serious shortage of textbooks as it was observed that one copy of a book for those subjects was used by more than a hundred pupils. These results indicate that collaboration between public and private sectors has not very much assisted to improve the quality of education as most of the PPP schools had shortage of subject text books. Patrinos and Sosale (2007) asserted and acknowledged that sufficient availability of subject textbooks (one text book to one pupil) is significantly associated with good pupils' academic performance. This is because the Ministry of Education, Science, and Vocational Training (MoESTVT) advocates a policy of one pupil to have and use one text book for each taught subject at school.

3.4.2. Pupils' Access to Exercise Books

The results in Table 12 show that 80.4% of the pupils indicated that they had enough exercise books in regard to all taught subjects, while 19.6% said that they did not have enough exercise books. Pupils from public schools were leading in reporting to not have enough exercise books compared to PPP and private schools. Responding on this challenge during a key informant interview, the Head Teacher at Kidia Primary School reported that:

"Some of the pupils are coming to school without adequate number of the needed teaching-learning materials. And sometimes my teachers do use their own money to buy exercise books or and pencils for pupils, something which is not fair provided that we teachers are lowly paid by the government".

The study findings revealed that private educational partners provided exercise books to some pupils, a situation which assisted the process of teaching and learning to be more effective among pupils and teachers hence improved the quality of education.

School Category	Counts and Per Cents	Whether Pupils Own Exercise Book for All Taught Subjects		Total
		Yes	No	
Public	Count	36	20	56
	%	64.3	35.7	100.0
Private	Count	55	1	56
	%	98.2	1.8	100.0
PPP	Count	102	26	128
	%	79.7	20.3	100.0
Total	Count	193	47	240
	%	80.4	19.6	100.0

Table 12: Whether Pupils Have All Exercise Books for Taught Subjects (N = 240)

Source: Authors' Survey

3.4.3. Pupils' Having Mathematical Sets

The study findings on this element showed that 26.7% of the teachers reported that their pupils accessed and owned geometrical sets while 73.3% of the total pupils did not have geometrical sets. Furthermore, the results showed that many pupils in public and PPP schools did not have mathematical sets, compared to their counterparts in private schools. This situation hindered effective process of teaching and learning among pupils and teachers. The Pearson chi-square showed significant association (Chi-Square = 5.358, $p < 0.05$) between pupils owning a mathematical set and good academic performance in the overall scores for the administered examinations (Table 13). The study revealed that not having a geometrical set was among the factors that led to poor performance in Mathematics subject among most pupils.

Whether a Pupil Own a Mathematical Set	Responses	Counts & Per Cents	Categories of Pupils Academic Performance		Total
			Good Performance	Poor Performance	
	Yes	Count	80	32	112
		%	52.3	36.8	46.7
	No	Count	73	55	128
		%	47.7	63.2	53.3
Total		Count	153	87	240
		%	63.8	36.3	100.0

Table 23: Cross- Tabulation of Whether Pupil Owned Mathematical Sets and

Categories of Pupils' Academic Performance (N =240)

Pearson Chi-Square = 5.358, $P = 0.014$: Source: Authors' Survey

Also, the study assessed the availability of nine tools which were supposed to be in the mathematical sets (ruler, compass, protractor, divider, pencil, pencil sharper, triangle, T-square and eraser). The results showed that few tools were found in the mathematical sets, and some of the pupils were found to have the mathematical sets without having any of the tools, except a pencil. Pupils' opinions showed that a ruler (92.1%), an eraser (93.0%) and a pencil (90.4%) were the tools that were mostly found while the most important tools (compass, protractor and divider) were not found in their mathematical sets (Table 14). These findings are contrary to those of a study by Rose (2006) who concluded that provision and accessibility of mathematical sets to learners enable pupils to be effective and conversant in their learning process hence influence their performance in many subjects, particularly Mathematics and Geography. Also, during a key informant interview, the academic teacher from Muungano Primary School reported:

Accessibility of mathematical sets facilitates the process of teaching and learning hence good academic performance among pupils.

Geometrical Tools	Responses	Per Cent of Responses (%)	Per Cent of Cases (%)
Ruler	105	12.3	92.1
Compass	102	11.9	89.5
Protractor	97	11.3	85.1
Triangle	80	9.4	70.2
T-square	82	9.6	71.9
Divider	79	9.2	69.3
Eraser	106	12.4	93.0
Pencil	103	12.0	90.4
Pencil Sharper	101	11.8	88.6
Total	855	100.0	750.0

Table 14: Multiple Responses on the Availability of Geometrical Tools to Pupils' Mathematical Sets (N = 112)

Source: Authors' Survey

4. Conclusions and Recommendations

The study revealed that most of the surveyed schools were found to have insufficiency of school infrastructure. Private schools had more sufficient school infrastructure compared with their counterpart public PPP schools and public non-PPP schools. Public non-PPP schools had the highest scarcity of school infrastructure. Since school infrastructure was an indicator of quality education, it is concluded that the quality of education in PPP schools was intermediate while the quality was the best and poorest in private and non-PPP public schools respectively. Inadequacy of school infrastructure is associated with ineffective teaching and learning process between teachers and pupils in classroom, hence poor quality of education. Also, schools with PPP interventions have a better chance of improving the quality of education compared to schools without PPP. Based on this conclusion it is recommended that school management and the educational department of Kilimanjaro Region should establish proper strategies for efficient collaboration with private partners to get rid of deficiency of school infrastructure as it is insisted in the Sustainable Development Goals number four and seventeen. Also, the administration and authorities of the Moshi District council and Moshi Municipality should prioritise and adequately budget for the availability of all needed school infrastructures in all schools.

The study revealed that most of the interviewed pupils had insufficient T/L materials, and this problem existed most in non-PPP public schools and least in private schools. Since school T/L materials was an indicator of quality education, it is concluded that the quality of education in PPP schools was intermediate while the quality was the best and poorest in private and non-PPP public schools respectively. Serious scarcity of teaching and learning materials, particularly text books is among the problems that impede the whole process of improving the quality of education at school. Also scarcity of T/L materials is associated with low literacy and numeracy competencies among pupils in the surveyed schools. In regard to this conclusion, it is recommended that school management and pupils' parents/guardians should form a platform for discussion and come up with solutions to ensure that each pupil gets enough T/L materials as required, instead of depending much to the government and private partners to provide T/learning materials. Furthermore, the Education Department of Kilimanjaro Region should manage and administer education regulations that require each school to have enough T/L materials.

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