EFFECTS OF PUBLIC PRIVATE PARTNERSHIPS ON EDUCATION SERVICE DELIVERY IN UGANDA: a comparative analysis of technical efficiency of secondary schools in Mukono district

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Abstract

In many countries globally including Uganda, governments have partnered with the private actors to deliver education services traditionally delivered by the private sector. This paper explored whether secondary schools under Public Private Partnership (PPP) arrangement are more efficient in respect to pass rate and enrollment. The study adopting a comparative research design compared secondary schools under Public Private Partnership (PPP) arrangement and those schools which are not under PPP arrangement. The analysis was based on sample of 95 secondary schools randomly selected from Mukono district. The results show that Non-PPP schools were more efficient than secondary schools under PPP arrangement in respect to pass rates. However, in respect to enrollment, secondary school schools under PPP were found to be more efficient. This implies that PPP arrangement impacts school enrollment by increasing the number of supported students to join the private school but this does not translate into school performance. Thus, although government efforts to partner with private secondary schools increases student enrollment, it has implications on school efficiency in respect to pass rate. The study recommends that PPP arrangement between government and private sector schools need to be revised to reflect the realities of the schools with respect to enrollment and performance outcomes.

*Keywords: **Public Private Partnerships, Efficiency, Education, secondary schools, Uganda.***

INTRODUCTION

Provision of secondary school education is greatly determined by the quality of systems which underpin clients' needs. Systems' strengthening for Public Private Partnerships is critical for equitable resource sharing. Even when resources are allocated for provision of services, a large portion of the resources might not reach the intended clients, in some cases, services may not even be provided because frontline providers do not show up to work, they are not well equipped resulting in poor service delivery thus not benefiting the intended beneficiaries (Abdullah, 2006a, Johnes, 2013).

In the recent past, many developing countries because of the growing importance of service sector to their economies, have promoted a number of interventions to supplement the traditional means of service delivery. In respect to education, interventions such as the Public Private Partnerships (PPPs) are fronted as one of the ways to achieve the desired education outcomes (Ahmed, 2000). Public Private Partnership refers to public and private sector actors, working together on the basis of shared objectives, strategies and agreed monitoring and evaluation criteria (Ahmed, 2000; Masereka, 2009).In the education sector, due to continued pressure to meet the goals of education for all, the Ministry of Education and Sports adopted the overarching program of the PPP (the Universal Secondary Education plan) after the Universal Post Primary Education and Training (UPPET) was launched in February 2007.

In 2007 Uganda became the first country in sub-Saharan Africa to introduce and implement the Universal Secondary Education (USE) program, USE as a component of UPPET covers lower secondary education (senior one to senior four). The main reason for the creation of the USE program is to address the large inflows of student from primary level that is to say to create access to secondary education. The arrangement was meant to enable students to enroll in private secondary schools under government free education programme. The government has been paying Shs 4,700 per student per term to the private secondary schools under the PPPs arrangement.

The number of secondary schools participating in PPP has steadily grown in Uganda. As of February 2010, there were 545 participating private schools. This number grew to 874 schools as at the end of the 2014 school year. Mukono district in particular has 32 PPP schools. The percentage of USE students enrolled in private schools has grown from 25% in 2008 to 45% in 2014-2015 (MoE, 2015). Schools that participate in the PPP program in Uganda are typically not elite private schools catering for wealthier families. PPP schools are usually started by communities or entrepreneurs in response to the lack of government-operated schools in the area. As such, these schools are not the high performing elite schools typically associated with the private school provision in advanced economies.

Although there is growth in public private partnership in the education sector with an aim of providing education for all, a big efficiency gap remains. Part of the problem is the failure to understand the actual shared contribution of the private sector and public sector within the framework of an established partnership. There is need to understand the extent to which such partnership contributes to the efficiency in the provision of education services generally.For instance, evidence shows that despite government financial commitment to PPPs in past, there remain gaps in secondary education outcomes in Uganda. Education outcome such as pass rate, enrollment, and progression have remain poor. This has put the PPP interventions in question particularly whether their promotion in the

education sector has had any significant impact or not. Part of the problem is the failure to understand the actual shared contribution of the private sector and public sector within the framework of an established partnership. There is need to understand the extent to which such partnership contributes to the efficiency in the provision of education generally. Few researchers have endeavored to examine the impact of PPP on education service delivery in Uganda (World Bank, 2011; Grimsey, 2002). This study therefore sought to investigate the impact of public-private partnership on education service delivery by comparing the efficiency levels of PPP schools (Schools under partnership of the government and Private sector) and Non- PPP schools (Purely government and Purely private) in Uganda.

The general objective of this study was to find out whether secondary schools under public private partnerships are more efficient than secondary schools which are not under public private partnership with reference to schools in Mukonodistrict. The research question that guided the analysis of the study was; how different is the level of technical efficiency betweenthe selected PPP schoolsand non PPP schools? The rest of the paper is organized as follows. Part 2 presents a literature review while part 3 presents methodology. Part 4 presentation and interpretation of findings and part 5 conclusions and recommendations.

LITERATURE REVIEW

Research studies in economics have adopted the concept of technical efficiency to understand the relationships between school outcomes and the various production inputs and interventions. Technical efficiency measures the pure relation between inputs and outputs taking the production possibility frontier into account. It looks at thelevel of output that can be produced with the use of a given level of inputs (Mandl, Dierx and llzkovitz, 2008). Other researchers such as Fredriksen (2010) have defined technical efficiency as the effectiveness by which a set of inputs is used to produce out puts. It also refers to the capacity of line agencies to use allocated resources in a manner that ensures the efficient and effective delivery of public goods and services (World Bank, 1998 in Boateng, 2014).

According to Boateng (2014), for government schools to be technically efficient, government should put in place a number support services such as remitting funds to schools timely; ensure that all funds leaving central government reach the intended beneficiaries; schedule supervisory visits to schools; and ensure that schools remain accountable by publishing and regularly auditing their accounts. However, a number of African countries even with tireless efforts fail to attain efficiency with reasons mainly surrounding the education system. For instance, large school size makes management very difficult, as well as low teacher to student ratio (Mandl*et al.,* 2008). Studies by Afonso and Aubyn(2006) and Nyanya(2015) have cited also other factors outside the education system. According

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to these studies, efficiency scores changes significantly when taking environment factors such as GDP/capita and education of parents into account. Basing on their studies even some countries outside Africa like Portugal, Hungary and Spain where seen to be performing inefficiently mainly due to their low GDP. Such findings portray the need and importance of improving our knowledge on the sources of efficiency as with this it can be helpful in identifying and working on the sources of inefficiency; below are the various determinants of technical efficiency and theireffect on the education sector performance.

In regard to class size, Cooze (2001) found out that there is some evidence to show that 'learning group' size increases student's achievement and in this he put it that a smaller size of the class enables the teachers to have some time with almost each of the students which is later transformed in to better performance. Related to the above however, (Thomas, 1982) found out that even within the same classrooms the amount of time teachers spend with each student varies considerably and is associated with differences in achievement for each student, and as a result students would perform differently basing on how much time the teacher spends on each student since verbal aptitude, and relationship between student and teacher directly impacts on the student's performance, this is in line with Summers and Wolfe, (1977); Levin, (1969); Hanushek, (1981) and Thomas (1977).

Odumbe, simatwa and Ayodo (2015) have revealed that teacher's qualifications play a great role in defining efficiency of a school. Teacher's qualifications were found to have a positive influence on the performance of students. In line with above, their study further showed that teacher qualification and training contribute positively to the kind of output that is obtained in the learning process, consistent with study by Karani*et al* (1995), who reported that, teacher resource is one of the most important inputs into the education system, and their efficient management and utilization is critical to the quality of learning outcomes. Nyanya (2015) also supports the above by finding the teachers' academic level as a major factor in determining performance he shows that due to this in Nigeria many educational institutions where being opened up to help teachers with no required academic and professional training, he identified Kenya to be in the same boat as Nigeria, he further identified other researchers like Eshiwani*et al* (1988) to have established that the level of education of a teacher matters in school performance in examinations, looking at the situation in Uganda this is really true as many schools keep on fighting for qualified teachers to employ in their teachers (Sempungu, 2011).

In regard to use of facilities, Nyanya (2015) and Gilbert (1996) have shown that there is a direct relationship between the qualities of school facilities available and school products. In this, a close relationship exists between the physical environment and academic performance of students. School

facilities consist of all the building in the schools for both academic and non-academic activities, equipment for academic and non-academic activities, areas for sports and games, landscape, farms and gardens including trees, roads, and paths. Other physical facilities include furniture and toilet facilities, lighting, acoustics, storage facilities, ICT, food services, special facilities for the physically challenged people. It should be noted that teaching and learning processes do not take place in a vacuum but rather in an environment well-structured to facilitate learning.

Stoner, Freeman and Gilbert (1996), described the environment of an institution as all elements relevant to its operation including direct and indirect achievement elements. The importance of facilities is also identified by Odumbe, simatwa and Ayodo (2015), who in the view of their respondents showed school performance to be influenced more by the effective use of the prevailing school facilities. Okories (2001) also supports the above by showing that the utilization of the school facilities brings about fruitful learning outcomes as it stimulates and motivates students, which does not differ a lot from (Yang, 2014) who identifies school facilities and academic achievement of students to be associated directly. In other words, other things being equal, as school facilities increase the number of good successes or promoted children increases, and vice versa.

According to Geeta (1996), whereas traditionally most governments have preferred to keep all or most of educational production in the public domain for fairness reasons, shortage in budgetary resource mainly as the number of students increase and as a result of this many governments have re-examined the role of the private sector in education. In Uganda today, the private sector is highly involved in running and management of secondary schools; single handedly or in partnership with the government. In most cases, private schools are more efficient than publically managed schools and this is mainly because private schools are accountable to parents who pay their fees.   The other reason why private schools are efficient is related to high competition among private school providers which ensures good quality of service (Geeta, 1996).

Notwithstanding the above, literature argues that when private and public actors join hands in the provision of education services, the PPP arrangement is expected to help to ease financial constraints on both sides. It is noted that through PPPs untapped private financial and human resources are utilized with help of government support (Karani et al, 1995). Therefore, by sharing risk between both the public and private sector, players in the education sector are able to use the resources optimally (Tallarini, 2016). This is possible through the increased accountability which is generally achieved through a process of regulatory oversight, a pre-identified monitoring and review process and the use

of incentives and disincentives to ensure that the targeted goal is achieved. The increased accountability ensures that maximum possible outputs are attained from a given set of inputs (Nyanya, 2015).

METHODOLOGY

The study adopted a comparative research design;where secondary schools under PPP were compared with those which are not under PPP. Comparative research design has been used in a number of studies because of its distinctive in measuring the independent variable in categories or groups (McMillan, 2008). The study was implemented in the selected secondary schools in Mukono district including thoseschools that were under public private partnership and those which were not. Mukono district has a total of 32 schools under PPP and 93 which are Non PPP. Therefore, from a total of 125 schools, 95 schools were selected based on Yamane (1967)'s formulae of sample size determination:

$$n \quad = \quad \frac{\mathbf{N}}{1+ Ne^2}$$

Where   n   =   Sample Size

N   =   Total Population

e   =   Confidence level

Therefore: $n = \dfrac{125}{1+125(0.05)^2} = 95$ schools

The study used stratified random sampling and Probability Proportional to Size (PPS) techniques in the selection of schools. Probability proportional to size (PPS) is a sampling technique for surveys or mini-surveys in which the probability of selecting a sampling unit is proportional to the size of its population (Leedy, 1980). Table 1 below presents the number of schools selected from each category. Data from selected schools was collected using structured questionnaire that was answered by either head teacher or the deputy head teacher of the school. In instances where any of the two were not available, some other person delegated by the school was approached to answer the questionnaire on the behalf of the school.

Table 1: Distribution of number of secondary schools selected in each category

Management	Number of	Percentage	Number	of

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	schools	Proportion to total size	schools selected
Public private partnership	32	26	25
Non-public private partnership	93	74	70
Total	125	100	95

A number of variables were used to explain capture the relationship between school output and inputs in both PPP school and non-PPP schools. The school output was measured by the number of pass rates and school enrollment. The school inputs included education level of teachers, experience of the head teacher, and education level of school heads, number of teachers, availability and adequacy of facilities.

Analytical framework for measuring performance of schools

In economic literature, it's difficult to measure performance of an organization that uses multiple inputs. However, researchers have adopted the concept of technical efficiency to understand the relationships between output and inputs in production process. In this study because school performance is an example of single output and multiple input production, the study adopted the widely used econometric approach for measuring technical efficiency based on the Stochastic frontier model.

The canonical formulation that serves as the foundation for other variations is the model developed by Aigner, Lovell, and Schmidt (1977) and is written as;

$$y = \beta'x + v - u, \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\text{(i)}$$

Where; y is the observed outcome (in case of this study it is the output produced by a particular secondary school in term of graduates with desired grades and number of students enrolled), $\beta'x + v$ is the optimal, frontier goal (maximal production output by the secondary schools) pursued by the individual, $\beta'x$ is the deterministic part of the frontier and v is the stochastic part (it accounts for random variation in output due to factors beyond the control of the school management for example natural calamities). The two parts together constitute the stochastic frontier. The amount by which the observed individual fails to reach the optimum (the frontier) is u, that is to say it is the inefficiency, in the case of education it would mean a school producing few students with the desired grades and enrolling few students given the number of inputs employed.

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The empirical secondary school production frontier is specified and identified in the form of Battese and Coelli (1992) model as follows;

$$Y_{it} = X_{it}\beta + Z$$

Where;

$\beta = (\beta_0, \beta_1, \beta_2, \beta_3, \beta_4);$

$X = (XTR, AF, PTB, EOH, and ELH)$ these are the inputs used in production such that:

XTR   is the number of teachers in the selected school

AF   is adequacy of facilities, this meant the level at which the available facilities are enough in relation to the school's demand.

PTB   is proportion of teachers with bachelor's degree.

EOH is experience of school heads

ELH is education level of school heads

Y   is the performance index of candidates in terms of pass rate and school enrollment.

One of the advantages of SFA over other measures of Technical efficiency like Development Envelope Analysis (DEA) is the fact that it can be used to compare schools with similar inputs, adjusting for external characteristics, and comparing all schools against the most efficient schools. And also, it imposes a less restrictive functional form on the association between inputs and outputs and so, allows for managerial and technical efficiencies to be influential (Agasisti and Belfield, 2014).The stochastic frontier estimation approach has the underlying assumption that all production units under examination are directly comparable. It may be the case, however, that the cost associated with a given level of production may be higher in one organization than in another for reasons that may reflect differences in the cost and production structures of different organizations rather than differences in efficiency.A Cobb Douglas stochastic frontier model was estimated with the five key basic inputs described above.

RESEARCH FINDINGS

Descriptive results

The results presented in Table 2 shows the mean difference in the major school inputs (proportion of teachers with bachelor's degree, percentage availability of facilities, percentage adequacy of facilities, number of teachers, experience of head teachers and education level of school heads) by whether the school is under PPP or not. In the Table 3, it is evident that, there is statistically significant mean difference in the proportion of teachers with bachelor's degree between Non- PPP and PPP schools. On average, non PPP schools have more qualified teachers than PPPs schools. In respect to the availability of facilities, the results show that there is statistically significant mean difference in percentage availability of facilities between PPP and Non-PPP schools. Non-PPP schools significantly have more facilities than PPP schools on average. The table also shows that in terms of adequacy of facilities, Non-PPP schools are associated with adequate facilities when compared to PPP schools and the difference is statisticallysignificant. For instance, on average PPP schools recorded having 56.7% of the facilities in adequacy while Non-PPP schools recorded having 69.8% of facilities in adequacy. We did not find significant difference between Non-PPP and PPP schools in respect to number of teachers, experience of head teachers and education level of school heads.

Table 2: Results for mean difference in the major school inputs by management type

School inputs	Non- PPP Mean	PPP Mean	Difference in means	P- value
Proportion of teachers with bachelor's degree	0.662	0.542	0.12	0.0358**
% availability of facilities	91.2	82.67	8.53	0.0077*
% adequacy of facilities	69.76	56.7	13.06	0.0212**
Number of teachers	29.71	32.32	2.61	0.4475
Experience of head teachers	1.23	1.44	0.212	0.068
Education level of school heads	1.11	1.2	0.0857	0.289

*Source: Primary data, **P<0.01, *P<0.05*

Correlation Analysis

To understand whether there is a relationship between the school inputs and school outputs, correlation analysis was employed and the results are presented in the Table 3. In the Table 3, it is

evident that there is a positive and statistically significantassociation between availability of facilities and school pass rate and enrollment, although the correlation is weak. The number of teachers was found to have significant positive correlation with enrollment but insignificantly correlated with school pass rate. Overall, other school input variables were not statistically correlated with school pass rate and enrollment as the table 3 presents.

Table 3: Correlation analysis results

Variables	Pass rate		Enrollment	
	Coefficient	P- value	Coefficient	P-value
Experience of Head teacher	-0.0397	0.702	0.127	0.219
Percentage availability of facilities	0.2194	0.033*	-0.228	0.026*
Percentage adequacy of facilities	0.1665	0.107	0.132	0.201
Education level of school heads	-0.021	0.838	0.146	0.159
Number of teachers	0.019	0.853	0.634	0.000**
Proportion with degree	0.165	0.110	0.127	0.221

Source: Primary data, **p<0.01, *p<0.05

Measuring technical efficiency of schools

In order to measure efficiency of schools under the PPP and Non-PPP arrangement, a school stochastic frontier production was estimated using the sfcrossStata command. Cobb Douglas stochastic frontier Analysis was used to estimate the model with fiveschool-based inputs (number of teachers, adequacy of facilities, proportion of teachers with bachelor's degree, experience of school head, and availability of facilities). Pass rate and enrollment of students were taken as the output variables of the school and therefore were the dependent variables. The results of the Cobb Douglas model are shown in Table 4.

In the Table 4, it is evident that with exception of the number of teachers which has negative coefficient, the coefficients of other school inputs are positive and statistically significant with respect toschool pass rate. The coefficient for number of teachers was surprisingly negative, implying that more teachers' size is associated poor results.

This contradicts the common knowledge that an increase in the number of teachers would lead to an increase in the pass rate of students as a result of reduced teacher to students' ratio. Perhaps the negative results may point to diseconomies of scale associated with large workforce. The positive and statistically significant coefficient of Inadequacy of facilities may imply the adequacy of school facilities such as teacher's houses, class rooms, laboratory, and library, is associated with increased

student performance in exams. This is perhaps true as adequacy of facilities creates learning environment that favors performance of students. The positive and statistically significant coefficient of proportion of teachers with bachelor's degree means that when the proportion of teachers with bachelor's degree increases, students' performance also increases. This reinforces the role of teacher's training in impacting students' learning and performance in exams. The positive and statistically significant coefficient of availability of school facilities implies that the availability of resources in a school is associated with improved student performance. The experience of the school head was also found to have statistically significant effect on the performance of students in exams.

In respect toschool enrollment, the results in Table 4shows that coefficient of number of teachers, proportion of teachers with bachelor's degree and availability of facilities are positive and statistically significant. This implies that these variables affect the school enrollment.

Table 4: Results of estimated stochastic frontier model

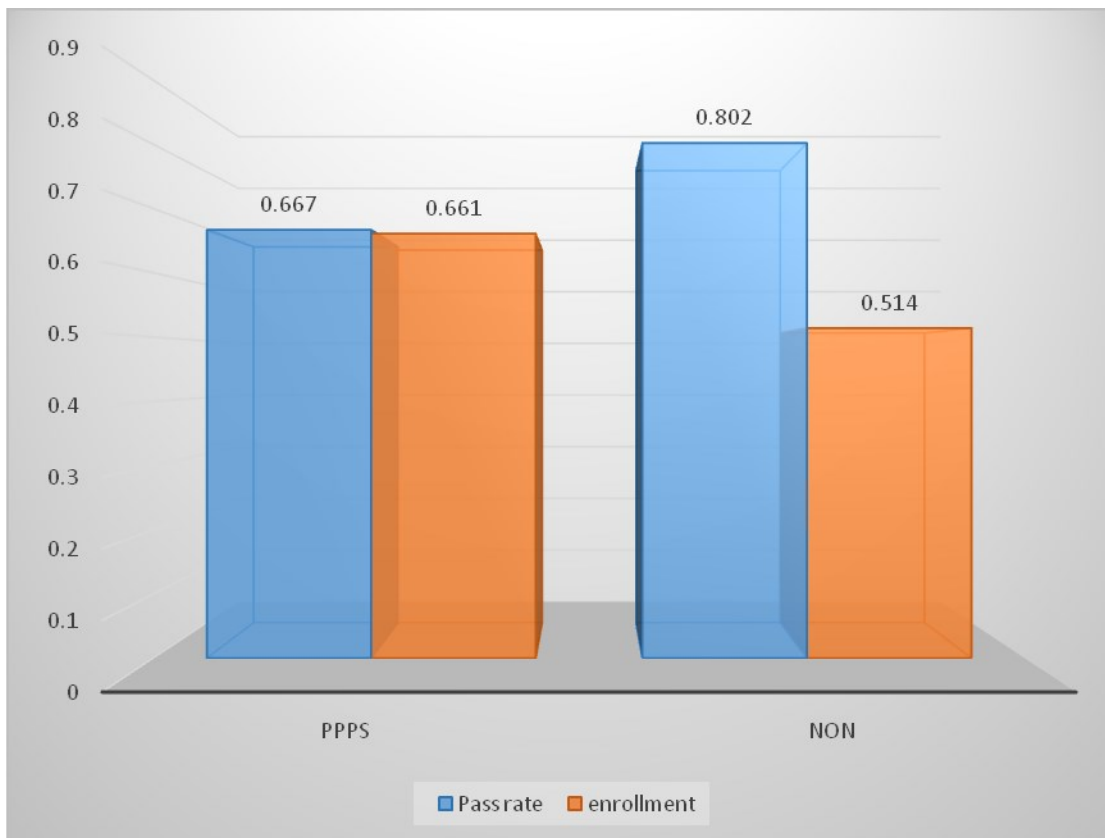| Input	Pass rate		School Enrollment	
	Coefficient	P. value	Coefficient	P. value
Number of teachers	-0.0031	0.000*	0.818	0.000*
Adequacy of facilities	0.078	0.000*	0.070	0.375
Proportion of teachers with degrees	0.0334	0.000*	0.348	0.022**
Experience of school heads	0.363	0.000*	0.219	0.230
Availability of facilities	0.180	0.000*	1.245	0.000*

*Source: primary data, **p<0.01, *p<0.05*

Efficiency Scores in PPP and Non-PPP schools

In order to understanding whether PPP schools are more efficient than Non-PPP schools in Mukono district, we compared efficient scores in both schools. The results presented in the figure 1 below showed that Non-PPP school are more efficient than PPP schools in respect to pass rate with an average efficiency score of 80.2% compared to the 66.7%. However, in respect to school enrollment, the schools under PPP were found to be more efficient than Non-PPP schools. This implies that public private partnership impacts school enrollment by increasing access to secondary education in those supported schools but does not impact performance outcomes. This may be partly due to the fact that the monies government pays for each student per term is too low compared to other purely private schools. It is also possible that the private secondary schools that implement PPP have learning constraints such as school infrastructure and with the added school numbers performance is

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constrained. Nonetheless, the PPP schools have on many occasions decried of government late remittance of funds which constrain their operations.

Figure 1 Distribution of secondary schools Efficiency scores in PPP and Non-PPP schools

Source: Primary data

CONCLUSIONS AND RECOMMENDATIONS

While Public Private Partnerships have gained momentum in the provision of public services such as education in Uganda,the study shows that this approach is not free from efficiency and performance challenges. The results show that while the PPP has enabled a significant number of students enroll in the secondary schools supported bygovernment; by paying fees under the Universal Secondary Educationprogramme, academic performance of students in those schools is poor. The programme has limited impact on student performance in general.Partly, because the fees payable to school supporting the PPP initiative is small compared to the fees students in Non-PPP schools pay, which over-archingly, affects the general service delivery. The fact that most PPP schools have fundamental challenges in relation to school infrastructure and resources, enrolling more students at low costs, more so, with delays in payment of thefees by government, complicates the already existing problems these schools face. Nevertheless, PPP in the education sector is a useful tool for achieving the government's educational policy objectives of increasing access to education.

Therefore, based on the above conclusions from thefindings, this study recommends that the PPP arrangement needs to be revised to reflect the realities on the ground.Particularly, as far as assessing whether the schools the government partners with have the capacity to accommodate students and perform efficiently withthe available resources.The government needs to assess whether the schools have the required resourcesand facilities such as adequate teachers, classrooms, science laboratories, workshops, and library services to educate the enrolled students.

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