Background Paper

The Efficiency of Secondary Education in Sub-Saharan Africa: EESSA Project

The Case of Uganda

November 2018

Secondary Education in Africa:

PREPARING YOUTH
FOR THE FUTURE
OF WORK

University of Sussex
Centre for International Education

THE EFFECTIVENESS AND EFFICIENCY OF SECONDARY EDUCATION IN SUB-SAHARAN AFRICA
EESSA PROJECT

THE CASE OF UGANDA

Research Report

October 2018

Acknowledgement

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Acronyms

CDSS	Conventional or Community Day Secondary Schools
CE	Cost Efficiency
CSS	Conventional Secondary School
DEA	Data Envelopment Analysis
DMU	Decision Making Unit
GER	Gross Enrolment Rate
Govt	Government
HT	Headteacher
IIEP	International Institute for Educational Planning
IQR	Interquartile range
ISE	Innovation in Secondary Education
LIC	Low Income Countries
LMICs	Low Middle-Income Countries
MF	MasterCard Foundation
MWK	Malawian Kwacha
NER	Net Enrolment Rate
Non-USE	Non-Universal Secondary Education
ODSS	Open Day Secondary Schools
OECD	Organisation for Economic Co-operation and Development
PD	Professional development
PSIPSE	Partnership to Strengthen Innovation in Secondary Education
PTA	Parents and Teachers Association
SD	Standard Deviation
SSA	Sub-Sahara Africa
STR	Student Teacher Ratio
TE	Technical Efficiency
UIS	UNESCO Institute for Statistics
UPE	Universal Primary Education
USD	US dollar
USE	Universal Secondary Education
USh	Ugandan Shilling
VRS	Variable Returns to Scale

Executive summary

Introduction

There is limited research on secondary education in sub-Saharan African context that explores the key factors that promote efficient and effective secondary schools. What there is includes IIEP studies by Lewin and Caillods (2001), and the outputs from the World Bank's Secondary Education in Africa programme that includes analysis of costs and efficiency (Lewin 2008). Knowledge gaps remain with the risk that African governments embarking on large scale reforms in secondary education may invest in ways that fail to identify the components of the system and processes that drive efficient and effective delivery of secondary education, and therefore which areas to prioritize investment to achieve universal access. This large study of secondary school efficiency and effectiveness in Uganda responds to this gap and provides evidence to inform discussions about key reforms in secondary education to improve quality and equitable access, especially for disadvantaged groups.

Study Methods and Sample

Using both survey and case study data, the study analysed school efficiency in different types and sizes of secondary schools. The main output measure was final examination grades. For an estimation of inputs, teacher numbers, student-teacher ratio, class sizes, teacher quality (qualified/unqualified), and other infrastructure and material resources in schools was used. The samples sizes for the analysis was based on 78 secondary schools. There isn't a single type of secondary school in Uganda which means students can have access to different types of schools and of different quality.

The first level of secondary school has 4 years while upper secondary level has 2 years. The two types of schools are government aided and privately funded. Four types of government-aided schools are (1) Non-Universal Secondary Education schools (NON-USE), (2) Universal Secondary Education schools (USE), (3) Seed and (4) Community schools. The three types of privately funded/owned schools (1) Non-USE, (2) USE–partnership with Government and (3) International schools. Given the preponderance of four school types within the secondary school supply in Uganda, the research on USE and NON-USE schools (both private and government sub-types), excluding the less common Seeds and Community schools.

School Efficiency – Applied definitions in the study

In this study we have defined and applied school efficiency in three ways.

First, efficient schools produce good learning outcomes, measured in terms of examination results with key inputs. This definition makes it easy to quantify efficiency because examination results are a measurable entity. In our case, we were interested in understanding the relationship between inputs (e.g., student teacher ratio, number of computers per students and per teacher and school infrastructure) and outputs (examination pass rates), hence mimicking a production function. This is referred to in the literature as *technical efficiency* and describes the transformation of a mix of inputs into desirable learning outcomes.

Second, efficient schools manage their human and financial resources well. This definition focuses on the internal management of schools. We drew on case studies of selected schools for insights into the challenges schools face in accessing and managing their resources efficiently. Schools make choices (or choices are made for them by de facto) on what purchases or inputs to prioritize, who to recruit or sometimes simply accept teachers assigned to them from national or district authorities, irrespective of their competence. When there is a funding gap, schools may have to appeal to parents to fill this gap, others may decide, in the face of limited finances, to restructure, e.g., combine classes or deploy resources away from activities that can impact on the quality of teaching and learning. All of these decisions have direct consequences on school efficiency and outcomes.

Third, efficient schools can be defined as schools which produce good results (e.g. examination results) for all students at costs that are affordable and sustainable. We were interested in whether secondary schools in Uganda can achieve the same learning outcomes for all students at lower costs or, whether some types of secondary schools are able to achieve higher learning outcomes at relatively lower costs.

Key Findings and Policy Recommendations

- A more efficient teacher workload system is required so that schools can maximise the use of teachers time. This will help to reduce costs due to excess teacher requirement.
- Private schools that have opted out of USE policy use their selection and progression policy to maximise their performance in the national exams.
- Public USE schools generally promote all their students through the grades and end up with a more mixed ability range of students taking the final exams. This makes public USE schools more efficient in terms of achieving high progression through the grades, but less so on examination results as an output measure of efficiency.
- Many students in private schools do not start school at the beginning of the term which could be due to higher fees and a reflection of difficulties some households experience paying fees at the start of the term.
- The chances of students dropping out are much higher if a student either attended a Non-USE private school or attends school in an urban area. The relatively higher dropout in Non-USE schools may be due to affordability and or selection out for academic failure.
- Private schools and some public schools are achieving technical efficiency by attracting students from a high socio-economic background. Increasing investment in such schools at the expense of schools attracting mostly disadvantaged students would not be a good policy choice.
- Analysis of teacher characteristics on school efficiency indicates that experience on the job, age and salary are predictive of schools that are technically efficient.
- Reaching both technical and cost efficiency is achievable for all schools relative to a frontier efficiency and regardless of school type. Even those schools that are disadvantaged in terms of resources, facilities and the quality of their workforce can improve their technical efficiency at reasonable costs through better school management and governance practices.
- Households make a considerable contribution to secondary education through PTA charges and other charges. Encouraging parental contribution produces inequitable access to quality secondary education. Unless, the state is willing and able to absorb many of these costs, the poorest in Ugandan society will find it difficult to access quality secondary education. Richer parents provide more to their schools than poorer parents allowing their schools to provide better quality secondary education. It will be more equitable for schools serving students from predominantly disadvantaged backgrounds to receive more in capitation grants so schools have no need for contribution from poor households.
- Staffing schools with more qualified teachers matters for technical efficiency. Introducing policies and incentives that reduce teacher turnover is important. A policy to lower class size for main subjects by discouraging class combination, and increased IT facilities could improve efficiency levels of many schools. Higher unit costs per student as well as higher teacher salaries and teachers' payment policies more in line with their experience and productivity would also improve quality.
- Teachers' salary is on average 11 percent higher in efficient schools, However, there are limits to what government's can afford in terms of raising teacher salaries across the board. Pay policies linked to teacher productivity (e.g. maximising time teachers spend in actual classrooms teaching, reviewing teacher workload to ensure equity) are strategies that could be considered.
- The number of PCs connected to the internet, PCs for school management and PCs per student are higher in more technically efficient schools. However, the number of PCs available for staff and student use in all secondary schools are woefully inadequate. Improving IT infrastructure and use in schools should be a policy priority. This has the potential to enrich the quality of the secondary school learning experience

There are a number of medium to long-term policy decisions that can address the issues raised by the findings:

1. Expand access to government USE schools (increase school size to at least 500 students) and improve the quality of education they offer by increasing investment in infrastructure –including greater access to web-enhanced technology, reducing class size and improving working conditions, especially in disadvantaged government USE schools to retain experienced trained teachers.

2. Review the teacher workload system to maximise the use of teaching time across the teacher workforce in each school.

3. The importance of technology in improving the quality of education is a well established fact. Secondary schools in Uganda are not putting themselves in the frame to maximise the opportunities that 21st century technology can provide for effective learning. A programme of investment in IT infrastructure and connectivity to the world wide web accompanied with training should be a priority to improve the quality of the student learning experience in secondary schools.

4. From the case study evidence, there appears to be little incentive for schools to become more efficient in their use of resources. More needs to be done to improve accountability in the secondary school sector. Increased accountability should target teachers, school leadership and districts. There needs to be investment to improve school governing boards capacity to manage schools efficiently

5. There are clearly constraints on effective management of schools because of the inability to provide adequate capitation on time. Schools have to rely on unstable PTA or parent contribution to fill the funding gap. A school's efficiency then becomes a function of the stability of external funding, and would make it difficult for effective planning to improve quality at the school level.

6. The reliance on capitation to pay for additional teachers or hire part-time teachers needs to be reviewed. Although guidelines stipulate that this should not exceed 20 percent of capitation, there are no incentives for schools to apply this rule. Government USE schools sometimes have on their teaching staff about 50 percent privately hired teachers on the school's payroll. In other words, these are teachers who would be paid using capitation and/or PTA contributions.

7. There needs to be a robust inspection and advisory system in place to ensure that all secondary schools including private schools meet minimum standards of practice considered appropriate. Strategic regulation is needed to guide the professional development of secondary schools within each of the different types of school bearing in mind the different patterns of administration, ownership, financing, and accountabilities. The State would have to improve its capacity to monitor schools and be prepared to increase its own budget to support a system of monitoring and evaluation to improve quality and efficiency of secondary education.

8. The Directorate of Standards Agency (DES), set up to inspect schools and check whether they are run efficiently and are focused on their core mandate of providing quality education is critical. An effective DES would ensure that schools are functioning efficiently. The DES should set standards that would motivate schools to operate more efficiently. A system of monitoring and evaluation where schools are appraised and those delivering quality education are recognised in inspection reports is one way of incentivise better management practices. At the moment, there are no clear standards or benchmarks that stipulates the basic requirements and norms for efficient performance of secondary schools. Norms for provision and registration should go beyond inputs to process measures.

9. There are indirect political economy issues arising from the findings of the research. Creating a secondary school system that works to improve quality for all will be achieved if ecosystem factors that influence how schools are run are given the needed attention. School governing boards must have real power to manage schools and hold headteachers and teachers to account in the use of resources and performance. Headteachers also need training in managing secondary schools and given more autonomy.

10. Accessing data for the analysis of school efficiency and effectiveness demonstrated the need for systematic data on secondary education in Uganda that is comprehensive to improve decision-making on investment to provide equitable quality secondary education. This also has implications for how schools can improve. The lack of school efficiency data readily accessible to school governing boards means it will be difficult for them to make informed decisions that can improve their efficiency and effectiveness. At the national level, improved database on secondary schools will be useful in monitoring performance and promoting policies that deliver quality secondary education for all.

1. Introduction

1.1. Background to the research

Secondary Education has recently received much attention by Sub-Saharan African (SSA) governments in response to increased demand necessitated by the success of universal primary education in the last 15 years. Although access to secondary education in SSA has increased, it is still much lower compared developed countries. Recent analysis of secondary school gross enrolment (GER) data show that the rates in 1960 were only around 52-53% for the OECD countries and the Eastern European and Central Asian countries but had reached 100% by 2010. In SSA, GER increased from a very low rate of only 3% in 1960, and reached 44% in 2010, which is close to the OECD average in 1960 (Glewee & Muralidharan 2015). In the case of lower secondary education, although participation rates have more than doubled, few complete and progress to upper secondary. Low entry and completion rates suggests that much more is needed to make secondary schools more efficient and effective to improve access, completion and learning outcomes.

The most recent analysis of data from SSA using data supplied to UIS (Lewin 2018 et al forthcoming) shows that Low Income Countries (LICs) and Low Middle-Income Countries (LMICs) in SSA now have similar average Gross Enrolment Rates (GERs) at primary level. These now average 102% and 103% respectively. However primary completion rates do differ and average 50% in LICs and 75% in LMICs indicating that as many as half of children are not completing primary school on-schedule successfully in LICs and for that reason alone will not enter secondary schools. At the same time 30 percent of students in the primary school systems are overage in LICs and 21 percent in LMICs. Low completion rates are correlated with over age enrolment and progression and have direct consequence on transition to secondary school - in effect, puts a cap on the possible expansion of secondary education (Lewin and Akyeampong 2009).

GERs for the whole of secondary school in SSA average nearly 40% in LICs and 70% in LMICs. The NER for Lower Secondary is 60% in LICs and about 80% in LMICs. The implication is that less than half of children complete lower secondary and fewer do so on schedule with appropriate levels of learning achievement. The largest gaps in school enrolment between rich and poor children are also at secondary level in LICs. These gaps are much larger than those correlated with gender. LICs have far fewer students at tertiary level with only 7% GER in LICs compared to 20% in LMICs. This creates a constraint on the training of graduate level teachers for secondary schools.

Table 1.1. Participation in Primary and Secondary in LICs and LMICs in SSA

	GER Primary	Primary completion	GER secondary	NER Lower secondary	GER tertiary
LICs	102	49	38	59	7
LMICs	103	74	65	82	20

Source: UIS 2017

Spending more on secondary education is unlikely to make it more effective and efficient unless it is used in ways that can improve quality (Lewin and Caillods 2001, Glewee & Muralidharan 2015). It is possible for similar schools with students from similar socio-economic backgrounds to achieve similar outcomes but with different levels of resources. This raises questions about school efficiency – first, whether schools have the basic resources and infrastructure to function effectively and efficiently, and second, the whether the resources are used efficiently to improve quality and increase learning outcomes.

Putting in place robust school management systems can help to reduce the risk of financial mismanagement, ensure that resources are utilised appropriately to improve learning outcomes. Also, the ability of schools to make resource, teacher management and curriculum decisions that suit their

context and circumstances is important, as is their ability to attract and retain qualified teachers. How schools optimise teacher workloads, utilise non-teaching staff, provide or support access to professional development activities for teachers are important vectors for achieving quality secondary education.

There is limited research on secondary education in sub-Saharan African context that explores the key factors that promote efficient and effective secondary schools. What there is includes IIEP studies by Lewin and Caillods (2001), and the outputs from the World Bank's Secondary Education in Africa programme that includes analysis of costs and efficiency (Lewin 2008). Knowledge gaps remain with the risk that African governments embarking on large scale reforms in secondary education may invest in ways that fail to identify the components of the system and processes that drive efficient and effective delivery of secondary education. As Grauwe & Varghese (2000) point out:

"… improving the efficiency of individual components does not automatically lead to improving an organization. Processes are contextual, and their improvement depends upon the capacity of each school to become an effective and efficient organization … Schools do not all function in the same way and reform strategies need to recognize this".

Also, Lewin (2015) notes that, "conventional public-school systems provide few incentives to schools to use teachers efficiently and timetable teaching to maximise the time on task of students"

Thus, it is important to develop a holistic understanding of the inputs, processes and factors which are responsible for improving the quality of secondary education in African schools. Without a holistic understanding, reforms in the sector will not produce equitable learning experiences that lead to improved learning for all secondary school students on the continent.

1.2. Background to the contract

Innovation in Secondary Education (ISE) is among one of MasterCard Foundation's (MF) initiative within its Education and Learning Program. The ISE initiative seeks to encourage innovation to promote equitable access and quality of secondary education, with a focus on the poor and disadvantaged. The MF has committed a total of $35.5 million for twelve ISE projects in Cote d'Ivoire, Kenya, Malawi, Rwanda, Senegal, Tanzania and Uganda. Of this amount, $22 million has been committed through The Partnership to Strengthen Innovation in Secondary Education (PSIPSE). PSIPSE is a funder collaborative that works to increase secondary education access and improve learning outcomes for disadvantaged young people in developing countries. To achieve this goal gaps in the research on secondary education in sub-Sahara Africa (SSA) needs to be addressed, particularly research that will expand knowledge and understanding of secondary schools' practices and processes in terms of governance, staff recruitment and deployment, financial management, human resource distribution and utilization with a view to identifying and generating greater efficiencies through improved processes.

The TOR for this research outlined the following objectives for the investigation into the efficiency and effectiveness of secondary education in SSA:

1. Review and document evidence, background literature and policies on school efficiency in the secondary education context,
2. Develop a theoretical framework to structure evidence and approaches to improving school level efficiency
3. Assess how secondary schools are governed, managed, resourced, monitored and how resources are allocated and utilized against a benchmark or a framework,
4. Identify opportunities to increase the efficiency of secondary schools through implementation of local solutions and actionable interventions, and
5. Recommend contextually relevant and innovative school efficiency measures to empower schools to sustainably finance, effectively govern, and improve the quality of secondary education.

Objectives 1 and 2 are addressed in the inception report and used to frame the research design and analysis in this report.

1.3. Structure of the country report

The report for Uganda has six sections. In the Section 2 we include a description of secondary school system in Uganda and in Section 3 we outline the design of the research (i.e. research questions and sampling framework). Section 4 includes a discussion on definitions of efficiency and how they have been applied in this study. Section 5 contains the empirical results for Uganda, and in section 6 we offer some concluding remarks. Section 7 contains some policy implications. In the technical Appendix 1 we present the definitions and conceptualisation of efficiency applied in this study and explain the technique employed to measure efficiency, that is, Data Envelopment Analysis (DEA) in more detail. In Appendix 2 we include Uganda's questionnaire which was used to collect data for the analysis in this country report.

In the country section analysis (Section 5), the presentation of results is carried out in three steps. Firstly, we employ raw measures / summary statistics to understand differences in resources, organisation, training, policies etc. between school types and by school location which may be linked to efficiency. Secondly, we present some preliminary analysis on cost and equity and their relationship to efficiency. Thirdly, we carry out an efficiency analysis (DEA) to examine the profile of efficiency of secondary schools in Uganda, based on achievement data (exit examination results) and flows (completion rates) as well as by relating the ranking of efficiency to overall schools' and teachers' characteristics. This allows us to identify the profile of efficient secondary schools.

2. Secondary Education in Uganda

2.1. Historical context

Independence and educational expansion were intertwined in Uganda, as was also true in Tanzania and Kenya, its neighboring East African countries. Tanzania was the first to attain independence in 1961. Uganda followed in 1962 and Milton Obote, the founding president, immediately emphasized the need to expand education to meet national development needs, with priority given to secondary education (Oketch and Rolleston, 2007). Uganda joined Tanzania and Kenya in developing policy initiatives toward expanding access to education by abolishing racially separated school systems that had existed during the colonial period and to integrate them into one national education system. However, this action did not expand access for the majority who had been excluded because fees remained a barrier (Oketch and Rolleston, 2007). This action further opened access to the emerging African political elites who could afford to pay the fees charged in what had been well-equipped, formerly Europeans-only schools. In Uganda, the situation was already better because there was a policy of 7 years of uninterrupted primary education and of 2 years at junior secondary, which was open to all who could pay for it. This had placed Uganda ahead of both Kenya and Tanzania in terms of transition to some form of secondary education, although in reality very few managed to go beyond primary education (Bogonko, 1992).

2.2. Policy context

Universal Primary Education (UPE) Policy

In 1996, Uganda announced universal primary education (UPE). Post-primary education, on the other hand, received less attention at the time (World bank, 2002, Lewin 2002). According to Lewin (2015), the effect of UPE was much less in higher grades several years after UPE, than it was in grade 1. Although enrolments increased, rates of drop-out and non-completion remained high. By 2005, there were 250,000 more children in primary grade 6 than in primary grade 7. This was the result of queuing in primary 6 for the opportunity to enter primary 7 and take the primary school leaving examination and which represented a new kind of inefficiency that delayed the achievement of 100% completion rates. Those held in primary grade 6 for more than one year were therefore unlikely to ever complete grade 7 and proceed through to secondary school. At about 19 percent in 2000, the gross enrollment ratio (GER) for the full six-grade cycle of general secondary education was well below the Sub-Saharan Africa average of almost 30 percent. Besides low coverage, access rates differed considerably by gender, parental income, and area of residence. Internal efficiency, student achievement and the quality and coverage of vocational and technical education and training were also low, comparatively costly, and ill adapted to labour market needs (World Bank, 2002).

Universal Secondary Education (USE) Policy

Various studies have shown that secondary education is in high demand in Uganda, and that the government has given consideration to policy reforms to meet the increasing demand (Keating, 2001; Lewin 2002; Penny et al., 2008). In 2004, net secondary enrolment was only 15 percent; 20 percent of school enrolment was provided by government schools, 69 percent by private schools, and 11 percent by self-financing community-owned schools. Because most children enrolled had to pay some form of school fees, secondary education in Uganda catered primarily to the wealthier sections of the society. In 2006, the government recognized that increased access to secondary education (academic and vocational) was needed to produce a more highly skilled and capable workforce, and to meet the demands of a growing number of primary school leavers. It therefore committed to expanding the secondary education system so that all primary school graduates would be guaranteed a place in post-primary education by 2015, especially those from low socioeconomic groups. In 2007, after a one-year feasibility study and financial assessment (Lewin 2006), Uganda became the first sub-Saharan African

country to set a goal of universalising secondary education by 2015 and began the process of reform in a select number of government and private secondary schools (Jacob & Lehner, 2011). An important objective of universalising secondary education through public private partnership (PPP) was to make quality secondary education available to all primary school leavers who gained access to secondary education (Liang 2002, Lewin 2002). The other reason was to manage the original Presidential ambition to have a village polytechnic in every district to the more realistic and developmentally beneficial idea of a secondary school in every district.

Eligibility of students for a USE programme is determined by a satisfactory score on the Primary Leaving Examination (PLE) at the end of Primary 7, (which in effect negates the principle of universal access), as well as successful and on-time completion of grades 8-11 of ordinary 'O' Level (lower secondary). The policy was introduced by starting with a specific cohort, with the first phase in 2007 targeting Senior 1 (S1) students in that year (Grade 8), and later students in higher grades in each successive year (Ministry of Education and Sports 2013, p 13). In 2011 the government launched a similar programme for the upper secondary (post O-Level). The USE policy was to be accomplished through a range of mechanisms, with a per-capita student grant provided to schools that opted for the programme (Omoeva and Gale, 2010). Government Non-USE schools had no reason to opt for the capitation since they already received full funding. High cost private schools financed themselves from high fees.

According to the Ministry of Education and Sports (MOES), the USE policy included managing the massive increase in schooling access brought about with Universal Primary Education (UPE) and extending the benefits of educational access to older age cohorts (MOES, 2013). Enrolment at Secondary level (grades 8-13) increased with the introduction of USE and Universal Post 'O' Level Education and Training (UPOLET) from 954,328 in 2007 to 1,284,008 in 2015. Business, Technical, Vocational Education and Training (BTVET) enrolment increased from 21,763 in 2007 to 87,963 in 2015 and a similar trend was realized at University level with enrolment growing from 96,821 in 2007 to 198,315 in 2015 (MOES, 2017). There were indications that the rapid expansion seen at the primary level in Uganda may be difficult to replicate at the secondary education level. The government recognised this challenge in its 2010 Education Sector Strategic Plan (ESSP), by noting that, "the policy of USE by 2015 poses challenges of both access and quality and has to [be] achieved within the resources available . . . as currently structured, the post-primary system cannot accommodate all the P7 completers who wish to continue their education" (2010, p. 41). It was also not clear that all children would want to complete secondary school given its costs and falling value in the labour market.

Public–Private Partnership Policy

The USE policy also adopted a public–private partnership (PPP) approach by involving the private sector in the provision of secondary education opportunities to the less privileged. This strategy remained inequitable since those in government Non-USE schools were fully funded and typically drawn from high socio-economic backgrounds. There was a long-term goal of improving access by reducing the cost of schooling in private schools (Ministry of Finance, Planning and Economic Development 2010) but it was unclear how this was to be achieved. In essence, it was transferring costs to households through the public-private arrangement. Under the USE PPP approach, the government pays tuition and registration fees for eligible students who enroll in private secondary schools that have opted for USE. Students in these schools often pay additional fees. This can exclude the poorest. Besides, teachers in these schools are less qualified and have lower salaries with little or no job security.

In 2018, the government indicated its intention to abolish the PPP arrangement with the 792 private secondary schools which have been implementing the USE programme. Two reasons were cited for this policy decision[1]: 1) Private schools inflate the number of USE schools enrolled to increase their income; 2) some schools fail to account for the funds they receive

[1] http://www.monitor.co.ug/News/National/Govt-stop-funding-800-private-USE-schools/688334-4266826-15iulss/index.html

A 2015 research study undertaken by the Economic Policy Research Centre (EPRC) in Uganda raised questions about efficiency in the sector. The report argued that inefficiency on the part of the Ministry of Education was a contributory factor, and that, the "practice of inflating the student register can be considered as a survival strategy aimed at maximising resources received by participating schools". It argued that a fixed grant that has not changed in the past 10 years of implementing the USE programme is largely to blame. Barungi (2017), in a response to the policy directive to abolish the PPP policy argued that, although spending guidelines of the USE stipulates that only 20% of the Capitation Grant should be spent on teachers' salaries, in reality it is the biggest expenditure. Due to demands for better teacher pay, schools spend more on teachers' salaries beyond permissible limits and spend much less on other services such as laboratory equipment and reagents. Also, head teachers may fail to account for the USE money because in many private schools, financial matters are strictly handled by the school proprietors". The EPRC study found that in some private USE schools, the powers of head teachers were restricted to general administration and instructional leadership … "proprietors/directors can completely hijack the powers of the head teachers regarding finances"[2]

In this study, we included the case study of a USE Private School and compared with government USE public schools to understand the challenges they both face in implementing an effective and efficient secondary education in Uganda. We also compared and contrasted efficiency indicators of USE and Non-USE schools (public and PPPs) for further insights.

2.3. School Types

In Uganda, the first level of secondary school lasts 4 years (Grade 8-11), and the second level - upper secondary level last 2 years (Grades 12 and 13). Schools are either government aided or privately funded or a mixture of both. There are four types of government-aided schools. These are Non-Universal Secondary Education (USE) schools, Universal Secondary Education (USE) schools, Seed schools and Community schools. Alongside these there are three types of privately funded and owned schools. These are Non-USE, USE–partnership with Government and International schools (PPPs). Apart from contributions from parents in various forms, government pays teachers' salaries in government aided schools, contributing about USD$33 per student for the first level up to O-Level and about USD$68 per student for the second level up to A-Level.

The government also provides education equipment and scholastic materials and infrastructure to government owned schools. Eligibility of students for a USE programme is determined by a satisfactory score on the Primary Leaving Examination (PLE) at the end of Primary 7, as well as successful and on-time completion of grades 8-11 of ordinary 'O' Level (lower secondary).

[2]See: http://www.monitor.co.ug/OpEd/Commentary/government-private-USE-schools-Ministry-of-Education/689364-4077346-nx42tlz/index.html

3. Design of the research

3.1. Research questions

Our overaching research question was:

What factors are key to improving the efficiency and effectiveness of secondary schools in Uganda.

Specific components of the research addressed the following questions:

1. What are the key determinants of efficiency of secondary schools in Uganda?
2. How does school level efficiency vary within and across different types of secondary schools?
3. Which group of school factors (e.g., school management, professional development, education approaches, etc.), are associated with efficiency?
4. How does cost per student vary by school type?
5. How does the quality of teachers, student-teacher ratios, basic infrastructure and technology impact on learning outcomes?
6. How does teaching staff to student ratio; teaching staff to non-teaching staff and utilisation of resources and teaching space compare across schools?
7. How does management and governance of secondary schools' impact on their efficiency and effectiveness?

Finally, we explored the implications of the findings in response to the following questions:

- What are the opportunities to increase the efficiency of secondary schools in Uganda?
- What actionable local solutions can be implemented to improve the efficiency of secondary schools in Uganda?
- What incentives would motivate stakeholders to improve the quality and efficiency of secondary education in Uganda?

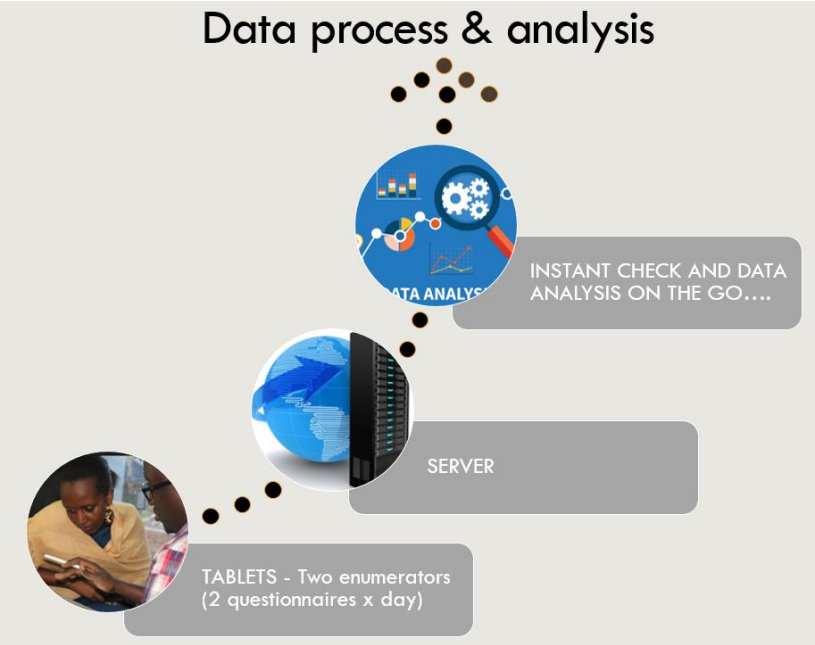
3.2. Design process

The research was carried out in two stages. First, we carried out a survey of different types of secondary schools in Uganda to develop an understanding of the key factors that determine school efficiency and quality. From the analysis of the large-scale survey, we purposively selected eight (8) secondary schools for in-depth qualitative analysis. The survey produced data for estimating school efficiency for different types or sizes of secondary schools. Our main output measure was final examination grades from which we obtained a school's pass rates and pass rates with distinction. For an estimation of inputs, we used the following data: teacher numbers, student-teacher ratio, class sizes, teacher quality (qualified/unqualified), and other infrastructure and material resources in schools (see Appendix 1). The questionnaire used had 52 questions (and several sub options). It was not possible to include the capabilities of students on entry as an input measure since the survey is school based. This is a limitation as some secondary schools have selective entry policies that would subsequently affect examination performance. The case study analysis provided in-depth examples of practices and challenges schools faced in delivery secondary education, and the choices they were making that either improved or reduced their efficiency and effectiveness.

We decided to use a specially designed Application (APP) pre-loaded on tablets for country research teams to use to administer the survey questionnaire. Data was loaded on to a server which the Sussex team accessed for analysis (Figure 3.1). We had two types of data sent for analysis through the server:

(i) one capturing information on the array of school background characteristics linked to efficiency (with the school as the unit of observation), (ii) a unique dataset for each school on teacher qualification, experience, and salary (here the unit of observations is the teacher within the given school).[3]

Figure 3.1 Data collection and analysis



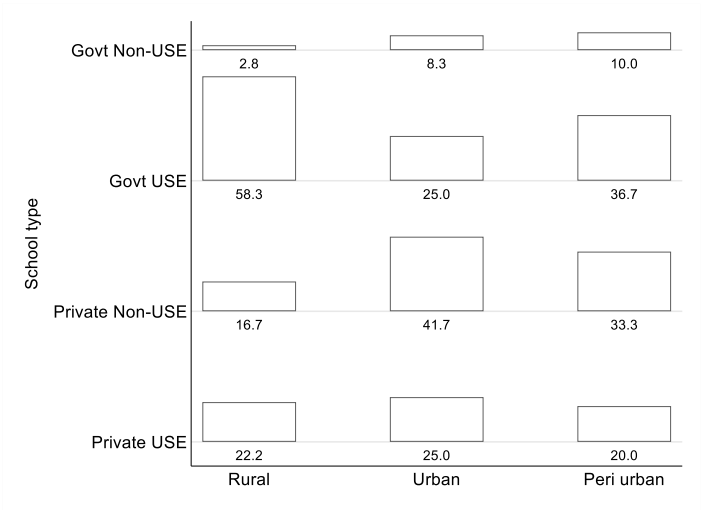
3.3. Sampling

Samples for the analysis are based on all 78 schools for Uganda. All indicators are secondary school indicators for Uganda (class 1 to class 6 or Grade 8 to Grade 13) and importantly we over-sampled the most disadvantaged schools as we were interested in measuring school efficiency more accurately for the schools types most likely to expand to meet increased demand for universal access.

We oversampled Universal Secondary Education (USE) schools, both private and government schools (67% of the total sample, or 52 schools out of the 78-total number of schools sampled). These schools do not charge school fees, the majority of students are from poor/disadvantaged communities and they have large classes and limited instructional facilities and overall tend to perform poorly. Within this group we oversampled schools in rural areas, which have the additional challenge of teachers having to travel long distances to school and they lack of key services linked to good infrastructure. Within rural areas, 58.3% are government USE schools and 22.2% are private USE schools (see Figure 3.2). Likewise, in Peri-urban areas, 36.7% are government USE schools. Non-USE schools, in contrast, charge high school fees, have well qualified teachers and good instructional facilities and hence are good performing schools whose students are from salary earners or business communities (that is, from urban areas). Hence, within urban areas, 41.7% of the sampled schools are from Private Non-USE schools which are big schools with good facilities. These schools cater for large populations of children and are profit making enterprises.

[3] This second dataset (which was merged to the main school dataset) is captured by question 20. For details, see Appendix 2 which includes Uganda's questionnaire.

Figure 3.2. Uganda school sample distribution (percentage by location)



4. Defining School Efficiency

Determining how efficient education can be provided has been a challenge for both researchers and policy makers. Schools can be seen as organisations which produce a mix of outputs from various inputs. We would expect that efficient use of resources would lead to outputs at the lowest level of resources. In addition we would expect that effective use of resources will ensure a mix of outcomes desired by parents and society.

In this study we have defined and applied school efficiency in three ways.

1. First, efficient schools produce good learning outcomes, measured in terms of examination results with key inputs. This definition makes it easy to quantify efficiency because examination results are a measurable entity. In our case, we were interested in understanding the relationship between inputs (e.g., student teacher ratio, number of computers per students and per teacher and school infrastructure) and outputs (examination pass rates), hence mimicking a production function. This is referred to in the literature as *technical efficiency* and describes the transformation of a mix of inputs into desirable learning outcomes.

2. Second, efficient schools manage their human and financial resources well. This definition focuses on the internal management of schools. We drew on case studies of selected schools for insights into the challenges schools face in accessing and managing their resources efficiently. Schools make choices (or choices are made for them by de facto) on what purchases or inputs to prioritize, who to recruit or sometimes simply accept teachers assigned to them from national or district authorities, irrespective of their competence. When there is a funding gap, schools may have to appeal to parents to fill this gap, others may decide, in the face of limited finances, to restructure, e.g., combine classes or deploy resources away from activities that can impact on the quality of teaching and learning. All of these decisions have direct consequences on school efficiency and outcomes.

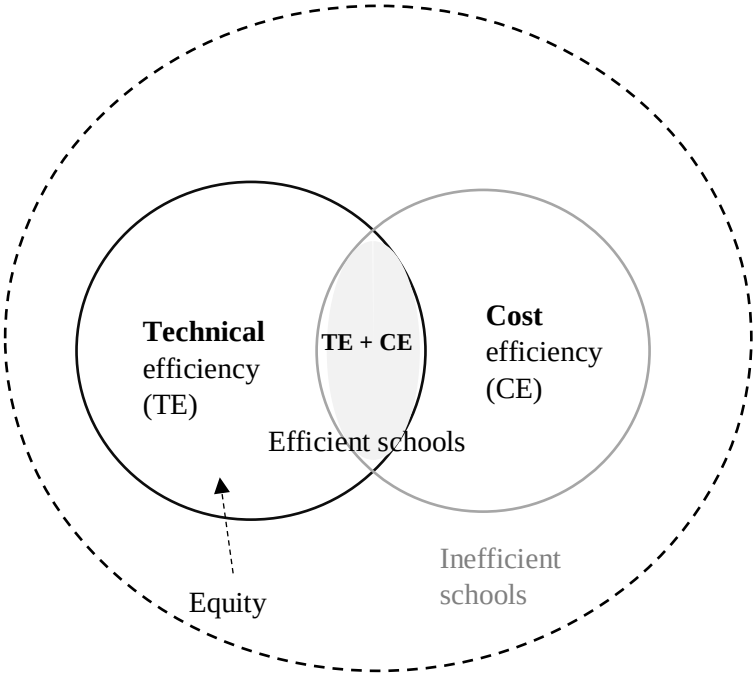
3. Third, efficient schools can be defined as schools which produce good results (e.g. examination results) for all students at costs that are affordable and sustainable. We were interested in whether secondary schools in Uganda can achieve the same learning outcomes for all students at lower costs or, whether some types of secondary schools are able to achieve higher learning outcomes at relatively lower costs.

These definitions suggest a focus on *outcomes, internal management, costs and equity* in an analysis of school efficiency.

Closely related to the concept of technical and cost efficiency is the idea of student flows through the grades. Lower flows, for example, caused by repetition or selection policy could be an indication of inefficiency in progressing all students through to successful completion. This is also an equity issue − do schools select students from backgrounds that maximises their chances of achieving good examination results and successful completion? In more selective schools, technical efficiency would be higher if higher student learning outcomes are driven by the higher socio-economic background of students. Thus, we were interested in whether more efficient schools are also more likely to operate selection policy where only the most able progress to the end of the secondary cycle to take the final exams, and the least able either dropout or repeat their grade.

A summary of the different aspects of efficiency is shown in Figure 4.1. The intersection between technical efficiency (TE) and cost efficiency (CE) shows schools that are able to maximise outputs for a given set of inputs, and at affordable costs. Schools which lie outside both TE and CE circles are highly inefficient. Schools can be technically efficient but achieve this at high costs, or they may be CE but not TE.

Figure 4.1. Technical and cost efficiency and equity



From the survey data we used a benchmark of technical efficiency based on an aggregation of inputs across all the schools in each country to construct an ideal model of schools of different sizes which we then compared with actual schools. The benchmark of technical efficiency is an index showing efficient schools that are able to maximise educational outputs. Where different schools lie in relation to this benchmark is then used to assess their level of technical efficiency. Examination passes and passes with distinction are used as proxy measures of learning outcomes. Finally, we applied Data Envelopment Analysis (DEA), a statiscal technique to distinguish between efficient and inefficient schools. For details of the technique, see Appendix 1.

5. School Quality and Efficiency in Uganda

5.1. Summary Statistics

This section presents information on the different parts of the designed questionnaire[4] using summary statistics. Each subsection captures different issues linked to the overall profile and functioning of secondary schools in Uganda. Our emphasis is on key differences by school type and location.

5.1.1. Schools' background characteristics

Tables 5.1 and 5.2 shows the distribution of schools in the Uganda sample. We included more disadvantaged schools in our sample -USE schools, which represent about 67% of the total sample (Table 5.1). Private Non-USE schools were about 27%. Old traditional schools (Government Non-USE), represents only 6.4% of the total sample. Most schools in our sample are non-urban (84.6%), either located in rural (46.2%) or in peri-urban areas (38.5%). Government USE schools in rural areas are about 27% of the total sample (21 schools) (Table 5.2).

Table 5.1. Distribution of school sampled by type (Uganda)

School type	Nmber of schools	Percentage
Govt Non-USE	5	6.4
Govt USE	35	44.9
Private Non-USE	21	26.9
Private USE	17	21.8

Table 5.2. Distribution of schools sampled by school type and location (Uganda)

School type	Rural	Urban	Peri urban
Govt Non-USE	1	1	3
Govt USE	21	3	11
Private Non-USE	6	5	10
Private USE	8	3	6
Total	36	12	30

Notes: (1) Rural schools are from rural areas; urban schools are from town and cities; peri-urban schools are from small town are peri-urban areas.

Table 5.3 shows that about 44% of students from government schools live more than 3 km from their school, and about 36% of students walk to school. Students in private USE schools live much closer to their schools (40% of students live 1 km away from their school).

Table 5.3. Distances from schools (Uganda)

	Average distance from residence to school			Proportion of students walking more than 3 km
	0-1 km	1-3 km	more than 3 km	
Govt Non-USE	47.0	34.2	18.8	15.9
Govt USE	23.7	32.4	44.0	35.8
Private Non-USE	25.5	44.1	30.4	23.6
Private USE	40.1	31.1	28.8	22.6
Total	29.2	35.4	35.4	28.4

[4] See Appendix 2 for details about the content of the questionnaire.

5.1.2. Headteacher background

Headteachers in Non-USE schools have served the longest as heads (18 years for government schools, which is 4.4 additional years of experience compared to headteachers from private Non-USE schools (Figure 5.1). In USE schools, a good proportion of the total working experience of headteachers has been spent in their current schools (39%-46%). These heads would have built their leadership capital from long working experience in the schools they manage.

Generally, headteachers have limited professional development opportunities: only half have engaged in some professional development over the last year (Table 5.4). Headteachers from peri-urban schools have less professional development opportunities (just around 33% of heads from Peri-urban schools have had professional development in the last year) compared to headteachers in rural schools. About 60% of them have participated in professional development in the last year.

Figure 5.1. Headteacher experience (Uganda)

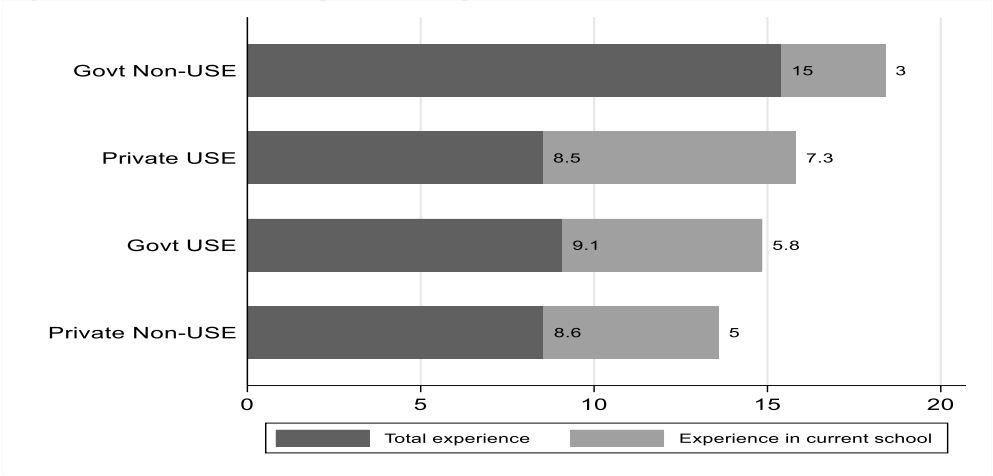


Table 5.4. Headteachers professional development – participation last year (Uganda)

school location	Percentage
Rural	61%
Urban	67%
Peri urban	33%
Total	51%

5.1.3. Impact of remedial and ability driven instruction

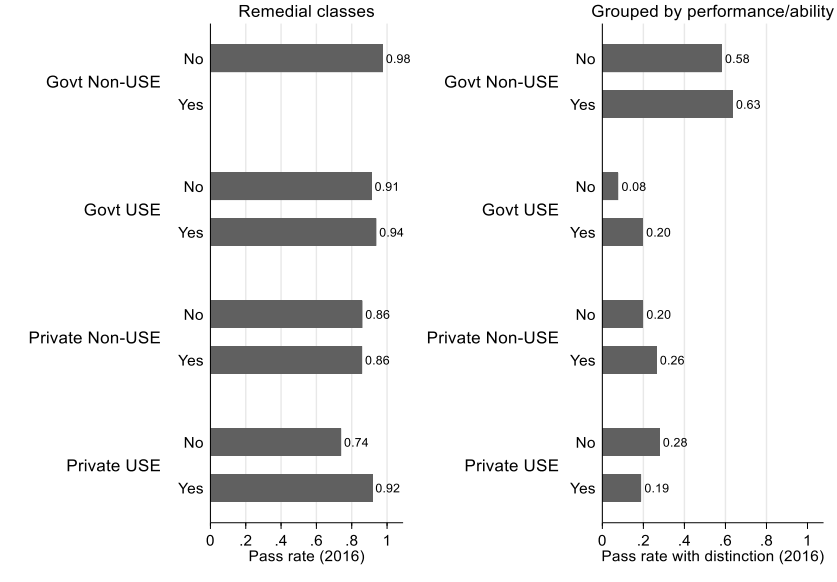
The practices of schools in terms of how they organise learning is important for understanding student learning outcomes. Remedial support for underperforming students in private schools (USE type) is correlated with an increase in passing rates[5] (about 18% increase, Figure 5.2, first plot) and just 3% increase in government USE schools. It would appear that remedial classes in private USE schools enhance passing rates of repeaters taking the exam.[6]

Grouping students by performance or ability is also correlated with the aggregate distinctions in most schools at grade 11 (second plot of Figure 5.2). It appears that remedial classes lift passing rates where students are from disadvantaged communities, whereas ability-driven instruction enhances pass rates

[5] All pass rates and pass rates with distinctions referred to grade 11 (the exam at the end of first secondary cycle).
[6] Indeed, private USE schools are ones with a high repetition rate (or influx of new enrolment at grade 11) since the ratio between grades 11 enrolment and 10 enrolments is larger than one (see Figure 5.3).

with distinctions. In effect, schools that have students from predominantly disadvantaged backgrounds and offer them remedial instruction improves their passing rates. Ability-driven instruction, allows more able students to achieve higher passes (distinctions).

Figure 5.2. Remedial classes, ability grouping and passing rates (Uganda)



5.1.4. School Finances

Across the 78 schools, about 37% of schools' extra income comes from unstable sources such as Parent Teacher Association (PTA) charges or other charges (Table 5.5). The lack of a stable source of income is not exclusive to private schools. About 49% of total income that government USE schools are able to generate does not come from fees.[7] For USE schools, non-fees-based contributions are between 20%-23%, lower than Non-USE schools –a difference which is statistically significant[8] - an indication that schools that have opted out of the government's USE policy also generate more non-fee income to support their operations.

Table 5.5. Source of funding by school type (Uganda)

	School funding		
school type	school fees	other charges	PTA contributions
Govt Non-USE	76.8	13.5	9.7
Govt USE	51.4	29.2	19.4
Private Non-USE	80.0	13.5	6.4
Private USE	60.7	21.6	17.7
Total	62.8	22.3	14.9

Government USE and private USE schools enrol the largest proportion of students from disadvantaged backgrounds (Table 5.6). This has implications for the ability of schools to generate extra income from parents. Schools with majority disadvantaged students are unlikely to be able to generate extra income to levels that can be generated by schools with mostly advantaged students.

[7] Note that fees, in the context of government schools, are capitation grants which may be used for different things.
[8] Moreover, a statistical comparison (t-test) of schools' non-fees related income shows that government schools relies much more in this source of income than private school (p-value = 0.0016).

Table 5.6. Proportion of socioeconomically disadvantaged students by school type (Uganda)

degree of disadvantage		Govt Non-USE	Govt USE	Private Non-USE	Private USE	Total
low	n	1	2	7	1	11
	%	20	5.71	33.33	5.88	14.1
medium	n	3	15	7	6	31
	%	60	42.86	33.33	35.29	39.74
high	n	1	18	7	10	36
	%	20	51.43	33.33	58.82	46.15

Notes: (1) The degree of disadvantage is measured by the proportion of students who from socioeconomically disadvantaged homes. (2) The degree of disadvantaged is low if between 1-33% comes from socioeconomic disadvantaged homes, medium if the proportion is between 34%-66% and high if it is above 66%.

Case study evidence suggests that PTA contributions from disadvantaged households are small and irregular. The government allocates 41,000 Ugandan Shilling (USh) (about $11 dollars) per term for government schools and 47,000 (about $12.65) for private schools. School fees for Non-USE schools are much higher. For example, school fees at Lugavve[9] private secondary school for Senior 1 to Senior 4 ("O" level) is about 350,000 Ugandan shillings (about $94) for day students, and 650,000 Ugandan shilling (about $175) for boarding students per term. In effect, parents are paying between USD$300-USD$500 a year, and with a GDP per capita of about USD$615 and 35% of the Uganda population below the poverty line of USD$1.9 per day, these schools will only be affordable for households in the top quintile of the income distribution. School fees for "A" Level (senior 5 and 6) is 380,000 USh (about $102) for day scholars and 680,000 USh (about $183) for the boarding section. In addition, parents pay about 170,000 USh on average (about $45.8) for uniforms. Lugavve school is in a peri-urban area. At Nkima Govt Non-USE, another case study school, parents pay as much as 59,0000 USh (about $159) for day scholars and 980,000 (about $264) for boarding students per term. These fees would place the Non-USE private schools out of reach for the poorest households. For most households this is unaffordable.

The capacity to generate extra income from PTA contributions can give some schools the extra income they need to purchase more learning materials and hire additional teachers. But this depends on the ability and willingness of parents to make additional payments. In one case study school - Mamba Govt USE school, the bursar indicated that the school struggles to raise money from its PTA. Often parents are unwilling to contribute additional funds and argue that it is inconsistent with the USE policy.

However, in large peri-urban schools, parental contribution to schools can be significant. In another case study school, Fumbe Govt USE school, for example, parents were paying 60,000 USh (about $16) per term towards lunch, apart from the 50,000 USh ($13.47) PTA contribution for teacher welfare and other running costs. This represents about 13% of GDP per capita and at least 10% of the income of individuals on the poverty line. For schools with low enrolment in rural or peri-urban areas, raising additional income from parents will be exclusionary for schools designed to reach the most marginalized, and therefore, inconsistent with USE policy.

5.1.5. Access, participation and grade transition

Table 5.7 shows that government schools, unsurprisingly, have the largest enrolments. Both, public and private USE schools have higher average enrolments than their Non-USE counterparts. The larger standard deviation on enrolment for USE schools indicates a mix of very small and large schools. Moreover, schools located in urban areas (towns and cities) and in peri-urban areas have the highest enrolments. These findings are consistent with what one would expect from government schools which

[9] Pseudonyms are used for all case study schools.

serve the majority of secondary school students and the private USE schools that are grant-aided schools.

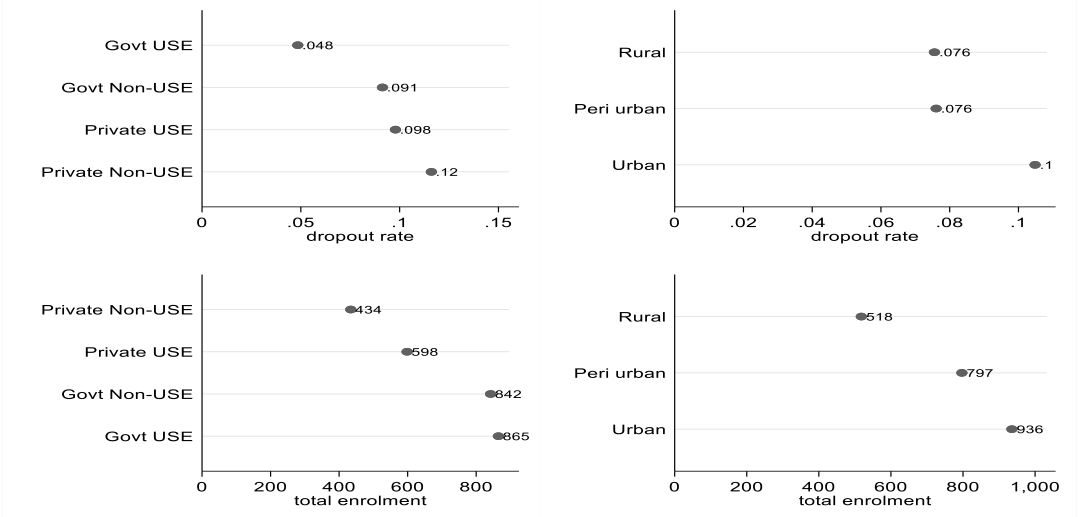
Table 5.7. Mean and standard deviation of school total enrolment (grades 8 to 13) by type and location (Uganda)

	Mean	Standard deviation
School type		
Govt Non-USE	842	438
Govt USE	865	675
Private Non-USE	434	343
Private USE	598	677
School location		
Rural	518	260
Urban	936	970
Peri urban	797	690

Figure 5.3 shows total dropout across the six secondary school grades in relation to total enrolment. Dropout rates are highest for private Non-USE schools (12%) −which also have the lowest enrolment. Dropout is lowest in government USE schools (below 5%) – which have the highest enrolment.

Peri urban schools have similar dropout rates as rural areas. The chances of students dropping out are much higher for a student attending either a Non-USE private school or an urban school. The relatively higher dropout in Non-USE schools may be due to affordability and or selection out for academic failure.

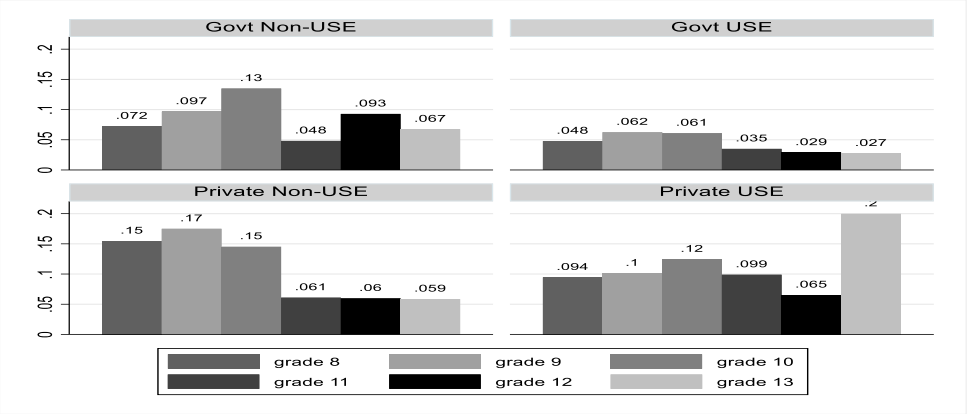
Figure 5.3. Average dropout rate by school type and location (grades 8-13) (Uganda)



Notes: (1) Dropout rates are the average dropout across the secondary school cycle over the total enrolment (across grades 8 to grade 13).

Figure 5.4 presents some interesting findings. It shows that before the last grade of the secondary school cycle (between grades 8 and 10), dropout rates increase regardless of the type of school. In all types of schools, dropout rates drop considerably at grade 11, especially in Non-USE schools where the dropout rate is a third of the rate at grade 10. This is an indication of selection before exams. Only in private USE school is the change in dropout from grade 10 to 11 not as large, but dropout rate highest at grade 13. This is probably an indication that the less able students leave school before the final examinations.

Figure 5.4. Average dropout rate by grade by school type (Uganda)

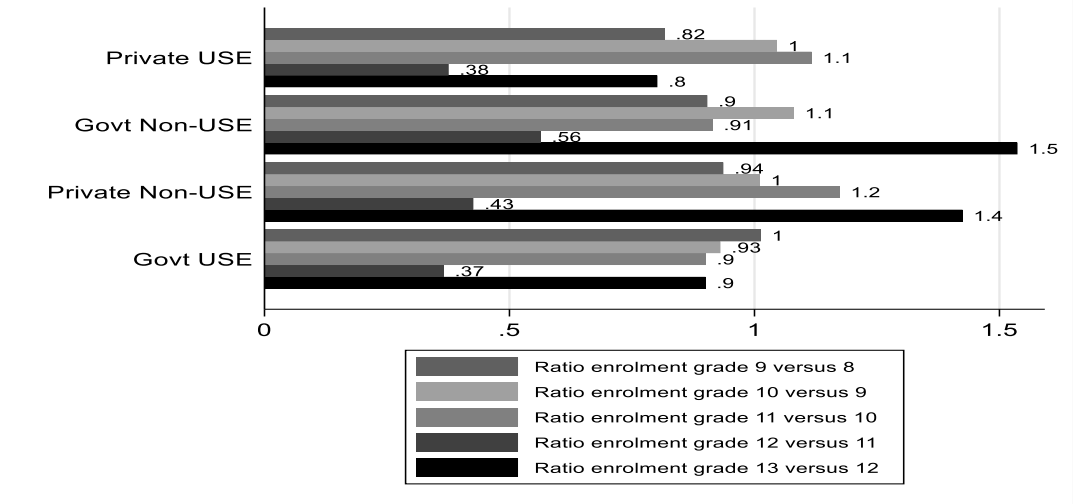


Notes: (1) Dropout rates per grade are obtained as the ratio of dropout for the specific grade divided by the total enrolment for the specific grade.

We explored selection and repetition by comparing consecutive grade enrolment. Figure 5.5 displays the degree of selection and repetition, obtained by dividing the enrolment between consecutive grades (grade x+1 / grade x). Lower ratios indicate stronger selection and a ratio above one either suggests an influx of students from other schools or higher repetition (in grade x+1).

In the first cycle of secondary school (the first three bars in Figure 5.5) selection is not an issue as ratios increase. The ratio between grades 11 and 10 is greater than 1 −indicating either some students are repeating or coming from other schools before taking the exam at grade 11. The only schools where there is a depature from this pattern are government USE schools (rate below one). It suggest that students in government schools are not being held up (repeated) before taking the exam at grade 11. Moreover, there is a sharp decrease in the ratio between enrolment at grade 12 in comparison to grade 11. This shows there is strong selection *after* the exams.

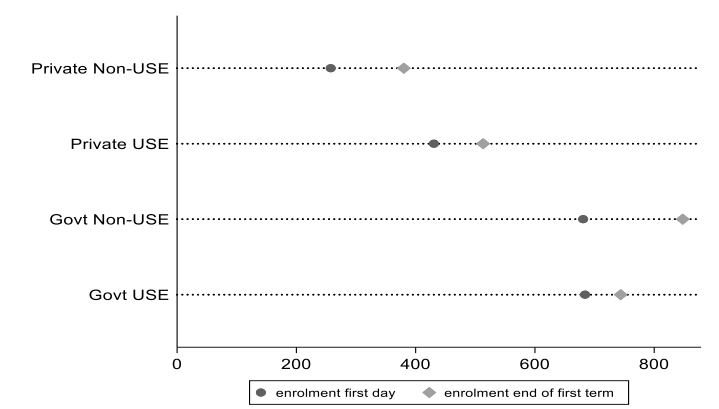
Figure 5.5. Selection across secondary school grades (Uganda)



Repetition peaks at grade 13 where ratios are 1.5 and 1.4 for Non-USE schools, but not in USE schools (ratio: 0.80-0.90). The most likely explanation is that the superior performance on national exams achieved by Non-USE students assisted by repeating underperforming students in the last grade of secondary school. Private secondary schools also have high repetition, which is consistent with this explanation.

A comparison of enrolment figures at the start and end of the first term provides a good estimate of late enrolment. Surprisingly, late enrolment is a common occurrence in all schools (Figure 5.6). Late starters would have had less tuition and risk poor performance. In Non-USE government schools, about 25% of students do not start school at the beginning of the term. In private schools nearly half (48%) start late. This is may be due to the difficulties parents have paying fees or other charges promptly.

Figure 5.6. Late enrolment by school type (Uganda)



The case study evidence indicated that parents of students in private Non-USE schools in peri-urban areas struggled to pay fees because most of were needy, small-scale farmers or single parents. Collecting fees from this group is challenging because of their poverty status. Sometimes schools would allow parents to pay in kind, usually with farm produce to feed students.

What emerges from the data on access, participation and grade repetition is that:

- Private schools that have opted out of USE policy may be using their selection and progression policy to maximise their performance in the national exams.
- Public USE schools generally promote all their students through the grades and would therefore have a more mixed ability range of students taking the final exams. They are more efficient in terms of progression through the grades, but may not do so well in technical efficiency terms.
- Students who do not start school at the beginning of the term will lose out on instruction and are more likely not to do well, repeat or dropout. This phenomenon is prevalent in private schools and could be because of higher fees that they charge
- The chances of students dropping out are much higher if they either attend a Non-USE private school or an urban school. The relatively higher dropout in Non-USE schools may be due to affordability and or selection out for academic failure.

5.1.6. Teachers – qualification, utilisation, turnover and professional development

Teacher qualification and utilisation

The professional status of teachers is important for understanding the quality of teachers. But, also how teachers are utilised is an important efficiency issue that contributes to learning outcomes.

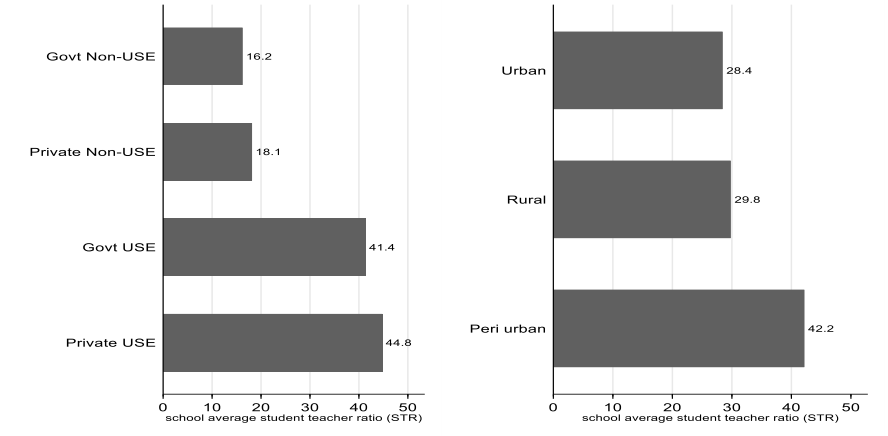
Private schools' which have generally lower enrolment have nearly twice as many professional support staff per teacher compared to government schools and more unqualified teachers (Table 5.8). In government USE schools there are 1.8 unqualified teacher per 100 qualified teachers whereas private USE schools have more than 12 unqualified teachers per 100 qualified teachers. In effect, private schools are mostly staffed by 'unqualified' teachers who have more professional support staff.

Table 5.8. Average number of teachers across school types (Uganda)

school type	qualified teachers	unqualified teachers	professional support staff	other support staff	% professional support staff for teachers	Ratio unqualified versus qualified teachers	School size
Govt Non-USE	51.0	0.3	11.4	10.4	22%	0.006	842
Govt USE	28.5	0.5	8.4	7.2	29%	0.018	865
Private Non-USE	17.2	1.6	8.6	13.0	46%	0.091	434
Private USE	15.6	1.9	8.6	6.9	49%	0.122	598

Figure 5.7 shows student teacher ratios for the different types of school.[10] USE schools have more than twice the number of teachers per student than Non-USE schools (i.e., the STR is less than half). Urban and rural areas have similar STR of around 29-30 students per teacher, but peri-urban schools have an additional 12 students per teacher (i.e., STR equals to 42.2).

Figure 5.7. Student teacher ratio (STR) (Uganda)



Beyond aggregate teacher stock per student in a school, the allocation of teachers and whether they are all being used efficiently is important. Table 5.9 shows a profile of teacher utilisation in eight case study schools drawn from the survey sample. It illustrates how schools might be using teachers to teach and the relationship with the student teacher ratio.

There are five main observations from table 5.9.

1. Generally, government USE schools have the highest student teacher ratios. Low student teacher ratios can be found in both government USE and private Non-USE schools.

2. With the exception of Mamba Govt USE school, all schools employ private or part time teachers, although they are used predominantly in private schools (USE and Non-USE). It is important to point out that private teachers are on the school's pay roll and not on government pay roll. At Nyonyi 50% of the teaching staff and at Ngabi 45% of the teachers are privately employed. About 52% of teachers in Nkima Private USE school are part-time teachers.

3. The average class size in all the case study schools is high −much higher than the student teacher ratios which suggests that schools are combining classes. Teaching large classes diminishes the quality of student teacher classroom interaction and opportunity to learn.

[10] Student teacher ratio are obtained as the total enrolment in a given school divided by the number of total teachers. Part-time teachers are counted as 0.5 of a full-time teacher within the sum of total number of teachers.

Table 5.9. Quality and Teacher Utilisation Indicators (Uganda)

QUALITY								
	Fumbe Govt USE	**Mamba Govt USE**	**Lugavve Private Non-USE**	**Nkima Private USE**	**Mpologoma Govt USE**	**Ngabi Govt USE**	**Nyonyi Govt Non-USE**	**Mpindi Govt USE**
Enrolment	3129	612	302	523	2434	824	1056	732
Total Teachers	80	38	24	25	69	48	72	37
Qualified Teachers	80	38	23	24	69	48	72	37
% Male Teachers	50	47	62	80	62	66	53	70
% Female Teachers	50	53	38	20	28	34	47	30
Contract[11] Teachers (Part-time or Private)	21 Private	None	7 part-time	13 part time	19 Private	22 Private	36 Private	11 Private
STR	39	16	13	21	35	17	15	20
Average[12] Class Size	110	70	60	90	100	90	80	96
AV. Teaching[13] period per week	30	30	24	26	28	30	24	30
# of Teaching Groups[14]	28	9	5	6	24	9	13	8
# of lessons to be taught[15]	840	270	120	156	672	270	312	240
# of lessons available per teacher[16]	11	7	5	6	10	6	4	6
Ratio[17] of Teachers to Classes	2.8	4.2	4.8	4.1	2.8	5.3	5.5	4.6

4. Teaching groups vary considerably and immediately raises questions about efficient utilisation of teachers given the size of the schools. Secondary school teachers are specialist teachers and because some subjects are compulsory (e.g. Math) and others optional, some teachers may have more students to teach than others. Schools have an important decision to make: they hire more teachers for subjects with high student numbers and hire fewer teachers in subject areas with smaller student numbers.

5. If every teacher taught every period, the class size would be equivalent to the student teacher ratio. For example, at Fumbe Govt USE the class size would be 39. Generally, the ratio of teachers to classes suggest that the actual workload of teachers is low. At Fumbe the teacher class ratio is about

[11] Part-time teachers are hired from other schools to teach a particular subject a number of periods a week. Private teachers are on the schools' pay roll and are hired and paid by the school. Private teachers are also paid from the school's own resources.
[12] This is the average number of students in a typical class.
[13] This is the average number of teaching period per teacher.
[14] Number of students divided by the class size.
[15] Number of teaching groups multiplied by the number of teaching periods per week.
[16] Number of lessons to be taught divided by the number of teachers.
[17] Number of teachers divided by teaching group.

3:1. In effect, when one teacher is teaching, two are elsewhere, not directly engaged in classroom teaching. Nyonyi Govt Non-USE (5:1); Mpindi Govt USE (5:1), Lugavve Private Non-USE (5:1) have the poorest teacher utilisation ratio. The high enrolment Govt USE schools, Fumbe (3129) and Mpologoma (2434) have better teacher utilisation in terms of teacher to class ratio. They also have the highest student teacher ratios 39 and 35, respectively.

There is a strong bonus culture in secondary schools in Uganda as revealed in the case studies. Teachers at Fumbe Govt USE, for example, received a bonus of USh 3,000 USh (about 80 cents) per lesson taught to top up their government salary. If a teacher teachers 240 lessons per term, equivalent to 4 a day, this amounts to about USD 600 a year (USD 200 x three terms). Often the argument given for the topup is compensation for heavy workload. However, table 5.8 suggest that teaching loads are generally low.

Mamba Govt USE school unlike Fumbe is a relatively small day school (population 612) in a peri-urban area and would not have as much from capitation and parental contributions as Fumbe USE school. Case study evidence indicates that teachers receive USh 10,000 (about $2.70) at the end of each term, which is meagre compared to Fumbe teachers where it appears a teacher can receive as much as USh 3,000 as bonus payment for each additional lesson.

The survey data indicates that the number of students per classroom is slightly lower in private schools (less enrolment and more classes) (Table 5.10). Government USE schools have more than 80 students per classroom whereas private schools have less than 50 students per classroom. High student classroom ratio is a greater problem in government schools, especially in government USE schools – an average STR of 40:1 and a SCR of 80.

Table 5.10. Classroom and student ratios (Uganda)

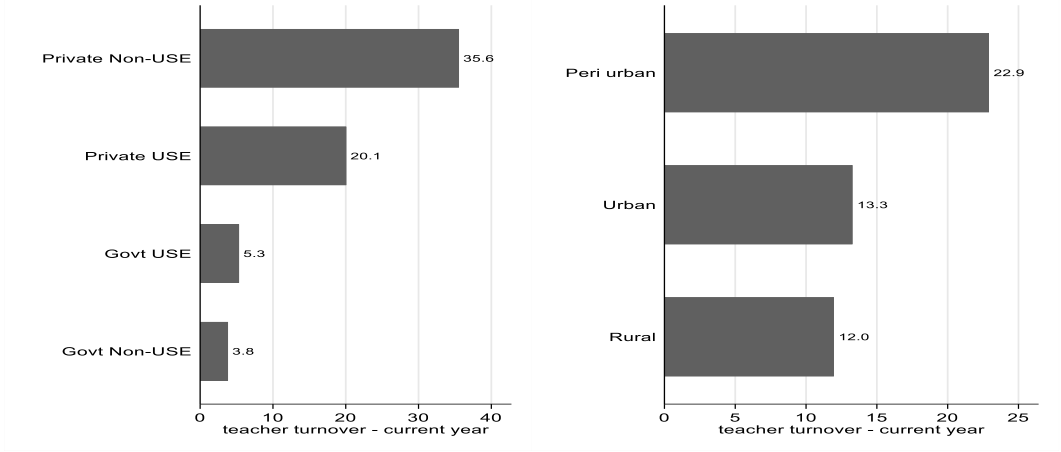
school type	Number of classroom	Student classroom ratio
Govt Non-USE	16.0	51.8
Govt USE	11.1	81.8
Private Non-USE	10.1	45.7
Private USE	9.9	48.7

Teacher Turnover

High teacher turnover is often an indication of a school or community environment which is not attractive to teachers, and which can affect a school's performance. High turnover means new arrivals are constantly taking time to assimilate and get used to the school culture. Teachers who leave take with them school-specific knowledge and experience. The potential benefits of a larger turnover through new entrants could be, on the other hand, the new ideas and experience new teachers bring into schools.

We compared the teacher turnover for the current year (i.e., the number of appointed teachers plus teachers who had left as a proportion of the total current teaching force) by school type and school location. Figure 5.8 shows the findings by school type and location. The overall mean teacher turnover average is about 14%, and perhaps not surprisingly private schools which have opted out of the USE policy having the highest turnover (36% for Non-USE and 20% for USE schools). In Government schools, turnover is significantly smaller – around 5.3% (USE) and 3.8% (Non-USE). Schools from urban and rural areas have low turnover (around 12%-13%) whereas for schools in Peri-urban areas turnover is about 23%. If more teachers are being appointed than leave to match increasing enrolment in a school that is also not maximising teacher workload, this can have negative consequences on cost efficiency.

Figure 5.8. Teacher turnover for the current year (Uganda)



Professional development

Overall, the amount of time allocated for professional development (PD) for teachers and the actual organisation of PD activities within schools are low across the Uganda sample –only 24% of schools provide time for PD and only 17% organised PD activities even though over half of schools (55%) reported having a separate budget for PD.

But generally, schools that are under the USE school policy have better policy on professional development. For example, they are more likelty to set a budget for professional development (PD), set time and organise activities for PD) than private secondary schools (Table 5.11).[18] Teachers in private schools, for example, are less likely to attend professional development (PD) activities.

Table 5.11. Teacher professional development (PD) support by school type – policies (Uganda)

School type	separate budget	provides time to go on PD courses	organises staff development activities	circulates information on PD courses in the district
Govt Non-USE	40%	0%	20%	20%
Govt USE	54%	37%	20%	37%
Private Non-USE	57%	14%	5%	48%
Private USE	59%	18%	24%	47%
Total	55%	24%	17%	41%

Subject-specific uptake of teacher PD is also quite low across the Uganda study sample –about 12% (Table 5.12). Schools outside the USE policy provide more time for subject-specific PD for their teachers - In Non-USE school, it is twice the average. Teachers from either government or private Non-USE schools have about 20%-22% chance of participating in courses or workshops related to their subjects, while in USE school it is just about 6%-9%. Participation in more generic activities linked to PD (collaboration, mentoring, observational visits) are also low. Thus, taken as a whole, PD is a low activity in all the secondary schools in the sample.

[18] For details on how the PD indicators were created, see questions 26-28 of the questionnaire (Appendix 2).

Table 5.12. Teacher participation on professional development, last year (Uganda)

school type	courses or workshops on subject and to discuss ideas/problems	collaboration on instruction and mentoring, peer observation	observational visits, networks
Govt Non-USE	20%	60%	50%
Govt USE	9%	48%	60%
Private Non-USE	22%	53%	56%
Private USE	6%	50%	20%
Total	12%	51%	49%

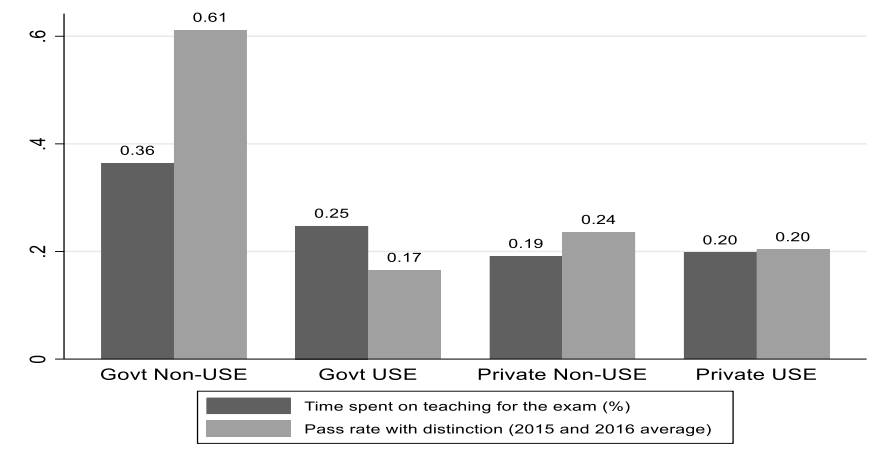
5.1.7. *Examination Preparation and Achievement*

How much time schools spend in examination preparation says something about how they are attempting to maximise learning outcomes. It also shows how much they are giving to direct instruction.

Government school teachers seem to spend a larger proportion of teaching time on preparing students for examinations as compared to private school teachers (between 5%-15% more) (Figure 5.9). This is consistent with the findings on selection and progression policy discussed earlier. Students accessing government schools are generally from disadvantaged backgrounds and their schools may feel the need to provide additional preparation for the final examinations. However, this does not necessarily translate into better performance in the final examination. Only government Non-USE schools allocate a large amount of time for exam preparation and as a result achieve the highest pass rates with distinctions. Government USE schools, in contrast, spend 25% of all time for exam preparation but obtain 17% of pass rates with distinction.

Private Non-USE and USE schools spend relatively less teaching time for exam preparation and produce slightly better results than Govt USE schools. As noted, private schools may be using their selection policies to enrol the best students and therefore less likely to use teaching time to provide extra exam preparation for their students.

Figure 5.9. Time used for exam preparation and achievement (Uganda)



Notes: (1) Pass rates with distinction are calculated as an average for the years 2015 and 2016 for the exam at the first cycle of secondary (grade 11).

5.1.8. Computer to student and teacher ratio

The amount and level of technology use in secondary schools offers insight into how well secondary schools in Uganda are positioned to provide learning experiences that tap into global knowledge and resources for learning. In the study, we used access to computers as a proxy of this measure.

Computer to student ratio across all schools is very low (between 2 to 4 PC for 100 students). Also very few PCs for student use are web-connected (less than four for all schools on average). Private non-USE schools are better resourced in terms of PCs per student. Teachers and management staff, too, have very low access to PCs. Connectivity is extremely low among all school types (Table 5.13). Such low availability to computers and connectivity means secondary schools in Uganda are not taking advantage of the possibilities that technology can offer to enhance students' learning experience.

Table 5.13. Average number of PCs and PC student ratio (Uganda)

school type	Average number of PCs for students per school	Average number of PCs connected for student per school	Average number of PCs for teachers per school	Average number of PCs for management staff per school	PC student ratio
Govt Non-USE	28.6	10.0	1.2	1.8	0.039
Govt USE	18.4	2.8	1.1	1.4	0.028
Private Non-USE	15.0	6.5	1.1	2.3	0.030
Private USE	9.3	1.6	2.0	1.0	0.019
Total	16.1	3.9	1.3	1.6	0.027

5.1.9. Teacher recruitment and allocation

School autonomy is widely regarded as an important condition for the improvement of school practices. Schools with greater autonomy can adapt more quickly to changing educational circumstances and make decisions that can enhance the student learning experience. As expected, private schools have more autonomy in recruiting teachers but also in deciding which classes they should teach. (Table 5.14).

Table 5.14. Autonomy on teaching selection and allocation (Uganda)

school type	Decide how many teachers the school needs	Decide which teacher teaches at what class level
Govt Non-USE	40%	80%
Govt USE	34%	74%
Private Non-USE	90%	95%
Private USE	88%	94%

For example, 9 out of 10 private schools made their own teacher recruitment decisions. Less than half of government schools have this level of autonomy. However, most schools decided which grade a teacher should teach (Table 5.13). The difference between government USE and private USE schools in deciding which classes teachers are assigned to teach is statistically significant, but not in the case of Non-USE schools.[19]

[19] A t-test for the variable "Decide which teacher teaches at what class level" across school types is significantly larger for private USE than government USE schools at 10% (p-value 0.09), but not for Non-USE schools (p-value = 0.27).

5.1.10. Completion and achievement

Pass rates are higher in government schools than in private schools (Table 5.15). The top achieving schools are government Non-USE schools, followed by government USE, Private Non-USE and finally private USE schools. This ranking is not surprising because most students will go to low fee private schools if they are not accepted into government schools. For pass rates with distinctions, there is a gap of 5%-15% between Non-USE and USE schools. Overall pass rates are stable across time, except for the sudden increase in distinctions for year 2016 for government Non-USE schools. Passing rates seems relatively easy across schools, but not for distinctions where Non-USE schools (with good instructional facilities, qualified teachers, and high school fees, etc.) outperform USE schools. It is important to note that pass rates with distinctions are not influenced by selection at grade 11. About 95% (2015) and 94% (2016) of those enrolled sat the exam across all schools, without any significant variation on this rate between school type (the range is 91% to 97%).[20]

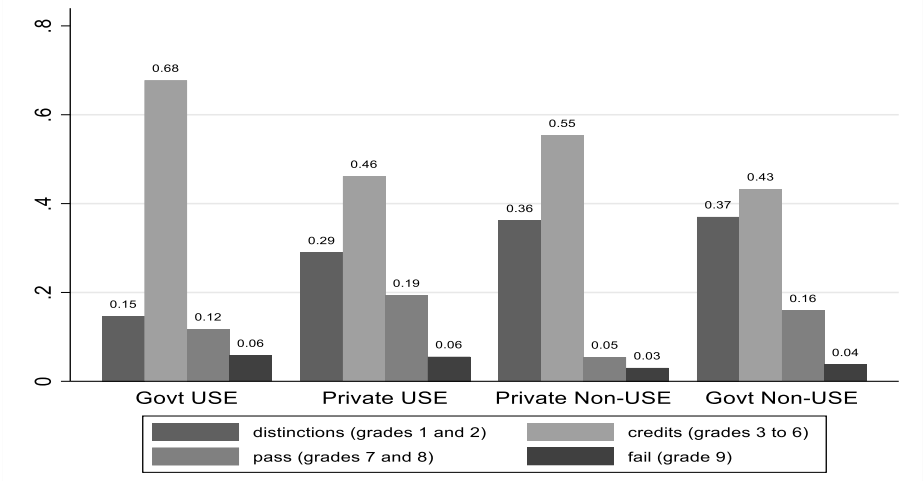
We also present results disaggregated by *fail*, *pass*, *credit* and *distinctions* at the end of the secondary school cycle (grade 13)[21] in Figure 5.10 (years 2015 and 2016 average). Distinction rates are (as in the case of grade 11) are higher for Non-USE schools. Failure rates are generally low. Government USE schools have the lowest number of students achieving distinctions (15%) but achieve the highest credits (68%). Good quality passing rates, that is, the compound rate for distinctions and credits are much larger in private Non-USE schools. The high performing schools are selective at this level.

Table 5.15. Pass rates and distinction rates (grade 11) (Uganda)

	Pass rate				Distinction			
school type	2013	2014	2015	2016	2013	2014	2015	2016
Govt Non-USE	97.8%	92.6%	91.4%	97.7%	39.4%	39.6%	34.6%	62.1%
Govt USE	89.7%	92.4%	91.2%	91.6%	12.6%	16.6%	17.8%	15.7%
Private Non-USE	86.3%	88.1%	87.3%	86.0%	22.0%	25.1%	23.8%	23.3%
Private USE	85.1%	86.8%	76.7%	77.0%	19.9%	21.9%	19.6%	20.4%
N	50	55	60	60	52	55	57	61

Notes: (1) Pass rates are for the exam at grade 11 (i.e., the end of the first secondary school cycle). (2) Rates are calculated as the total number of students who passed (or obtained distinctions) over the total number of students who sat the exam.

Figure 5.10. Passing rates for exam at grade 13 (end of secondary) (Uganda)



[20] All correlations coefficient between selection and pass rates with distinctions are very small, below zero (-0.10-0.00), and non-statistically significant.

[21] This is based on question 50 of the questionnaire (see Appendix 2).

5.1.11. Cost

We collected data on school expenditure and salaries in the last academic year to calculate the unit cost per student (Table 5.16). This analysis does not include boarding costs as these were more difficult to collect.

Table 5.16. Costs (Uganda) [22]

school type	cost expenditure per	cost salary per	total cost…	total unit cost per student	ratio of salary to non salary expenditure cost
Govt Non-USE	37822	114208	164966	46	3.02
Govt USE	12312	84976	97288	16	6.90
Private Non-USE	12199	34757	46956	32	2.85
Private USE	12999	24434	37433	25	1.88

Notes: (1) All costs are yearly and transformed into US dollars from survey data local currency reports (exchange rate: 1 UGX =0.000269636 USD). (2) Expenditure costs includes the following items: food, water, electricity and vehicles expenditure. (3) Salary cost includes the total government and PTA contributions for headteacher, deputy teachers, management, graduate teacher, qualified and unqualified teachers, and professional and other support staff. (4) Total cost is the sum of expenditure and salary costs. (5) Unit total cost per student is the ratio of a school total costs divided by the total enrolment.

On average, larger unit cost per student is positively correlated with pass rates with distinctions. The (total) unit cost per student is nearly three times larger in government Non-USE schools than in government USE schools (46 against 16), and 30 percent larger for Non-USE private school than it is for private USE schools (32 against 25) (Table 5.16). Importantly, the larger unit cost of Non-USE schools appears to be come from infrastructure related expenditure. Also, the ratio of salary to non salary expenditure is lower (around 3) in Non-USE schools than it is for government USE schools (about 7). This translates to Non-USE schools spending an additional 4 US dollars on salaries for every dollar spent on items related to infrastructure.[23]

Case study evidence provided further insights into the cost and financing of secondary schools in Uganda. The Universal Secondary Education (USE) policy was launched to "expand access and improve attendance in secondary education", "reduce high cost of secondary education" and "increase equitable access to secondary education." (MOES, 2013, 15). A key element of the policy was the introduction of a capitation grant to both government and private schools that offered secondary education under the USE policy. The capitation grant is intended to substitute for the costs of tuition and related fees, which previously been passed on to the students' families or absorbed at the school level (MOES, 2013; Omoeva and Gale, 2016). The amount of the capitation grant depends on the type of school that the student attends; 41,000 Ugandan Shilling (USh) for government schools and 47,000 for private schools per term and 82,000 USh for A Levels (senior 5-6). USE schools are required to open a bank account for the grant to be transferred as a lump sum every term, based on the number of eligible students. This is used to to pay for instructional materials, salaries of teachers -capped at 20% of capitation, who are not government employed, infrastructure, other school related activities which require funding. However, payment of teachers' salaries is one of the biggest expenditures schools face. Guidelines require for PPP schools the funds be spent on covering tuition per eligible pupil, teacher salaries and other inputs (Barungi et al., 2015; Omoeva and Gale, 2016). In USE government schools, parents are still expected to provide their children with scholastic materials.

Parents of a day student would pay about 400000 USh (USD$110) a year, which will exclude access to children of parents living below the poverty line. The capitation grant has not been increased in line

[22] For detail on cost, see questions 51 and 52 (Appendix 2).

[23] Most of the expenditure on infrastructure comes from boarding schools (which are 39, or 50% of the sample); around four / five times larger for boarding schools. Though wages costs are similar across boarding and non-boarding schools (except from Private Non-USE with wages doubling those from non-boarding schools).

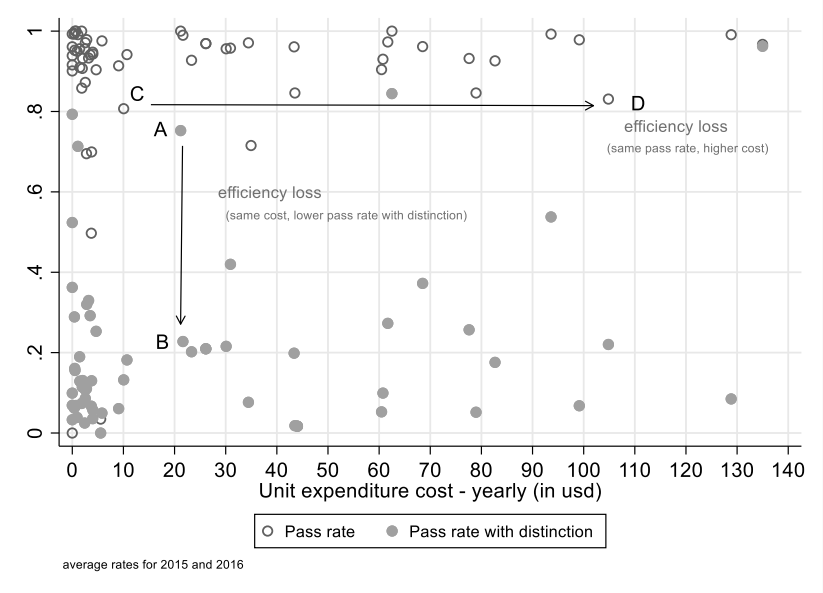
with inflation since its introduction in 2007, and the irregularity in the release of capitation grants means schools have to increasingly rely on contributions from parents to fund their activities.

5.2. School Efficiency

5.2.1. Pass rates, costs and equity

Figure 5.11 shows the total unit cost per student against pass rates and distinction rates (based on 2015 and 2016 exam results data at grade 11) for each school. Most schools achieve the same pass rates but at very different unit costs; for instance, a 90% pass rate can be achieved with unit costs varying between $50 and $250. The figure shows that both schools C and D attain a pass rate of about 70% but school C achieves this at a unit cost of $140 lower than school D. The segment CD is an approximation of relative cost efficiency for school C in comparison to school D. Variation in unit costs also applies to distinctions; the four schools on the bottom right corner achieve the same distinction rate at a cost three times higher than the average school. Also, schools A and B have similar unit cost ($50) but school A is able to achieve a pass rate with distinctions 40% higher than school B. There are other factors which affect how well schools utilise their resources and achieve good results. Effective teacher management is key. For example, government USE case study school Mpologoma introduced a biometric attendance machine for teachers to check attendance and contact hours. Thus, some of the variation in the output measure (pass and pass with distinctions) may be due to effective school and teacher management. Nevertheless, the wide variations in unit costs and achievement is an indication of widespread inefficiencies in secondary schools in Uganda. It is also an indication that schools can improve achievements at affordable costs.

Figure 5.11. Unit cost and pass rates (Uganda)



An additional issue is the relationship between unit cost increases and increases in learning outcomes (passing rates). We plot this relationship in Figure 5.12 using the unit expenditure cost by school type.[24]

Not surprisingly, in all schools, increasing expenditure costs for *fixed enrolment size* leads to larger learning outcomes. At a given unit cost expenditure, pass rates with distinction are higher for what USE schools spend per student. Next are Non-USE schools and finally private USE schools. Private USE

[24] The relationship between the outcome, pass rates with distinction, and costs in Figures 6.10 and 6.11 is obtained by running a non-parametric regression using also dummies for school types and plotting the marginal effects. This explains why the estimated relationships are smoother.

schools are the only school types where increasing the unit cost on expenditure actually leads to lower outcomes (after $110).[25] What schools spend on is important in determining impact on learning outcomes. Underfunding can impact on how schools allocate their resources. In one peri-urban case study school, the headteacher explained that under-funding compromised their ability to focus more resources on services that can improve teaching and learning. According to the bursar of a government USE school, under such circumstances, the school prioritizes paying private teachers' salaries and teacher bonuses, with little left for other important inputs necessary to improve the quality of secondary education.

Figure 5.12. Unit cost (expenditure) gradients and distinction pass rates (Uganda)

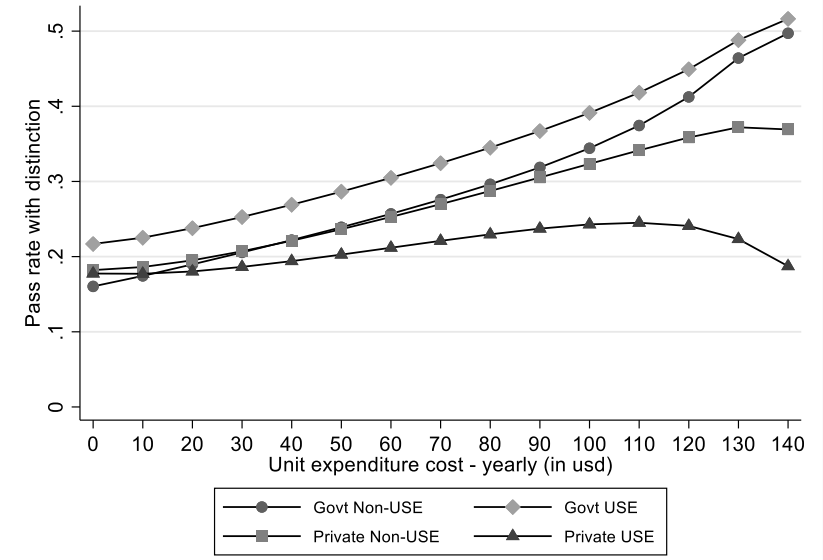
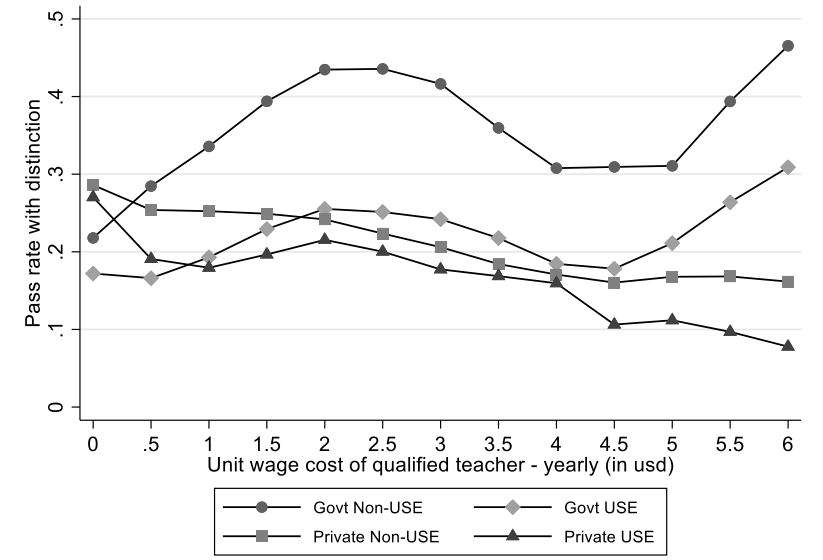


Figure 5.13 suggests that private USE schools are the least cost efficient from the point of view of wage costs (i.e., the cost function is below the other three types of schools). Higher increase at the top end of the distribution of wages of qualified teachers (above $4.5) within government USE schools is related to larger distinction rates.

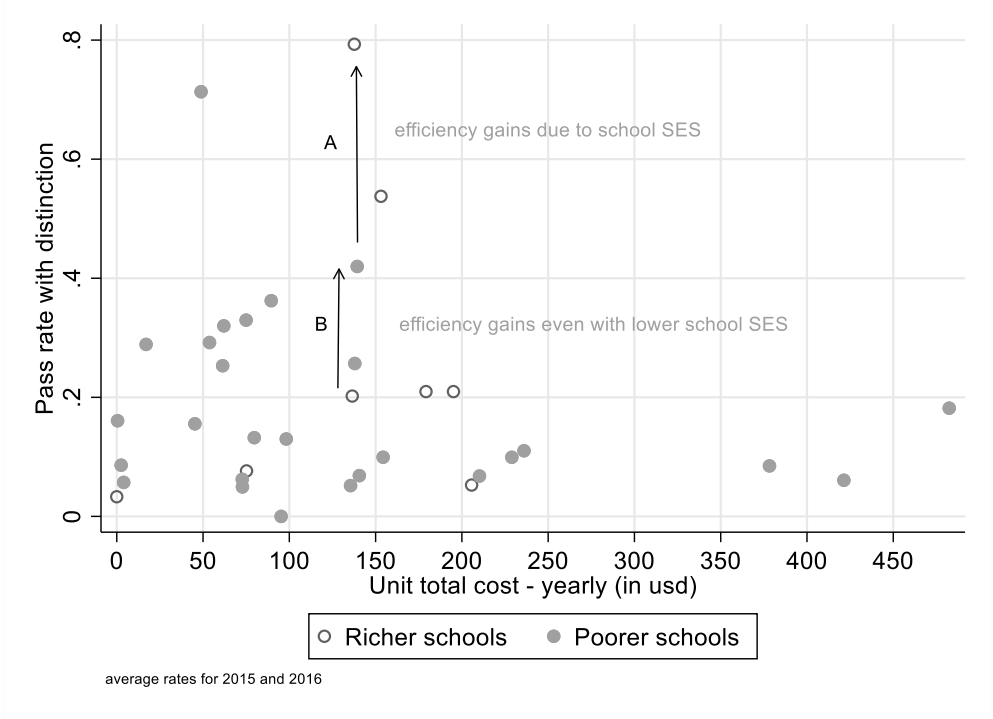
Figure 5.13. Qualified teacher's wage gradients and pass rates (Uganda)



[25] For total unit costs (which also include wages on top of infrastructure costs), gradients are flatter.

Figure 5.14 shows the total unit cost and pass rate with distinction by the socioeconomic status of students attending schools –a proxy for whether a school is poor or rich. This analysis suggests that, in cost efficiency terms, it is possible for a poor school to be more cost efficient than a rich school There are, of course, richer schools which produce higher learning outcomes at the same cost (point A) and cases where the socio-economic status of the school does not seem to matter much (point B). Nevertheless, the overall message is that predominantly poor schools operating at relatively high unit costs and not delivering high learning outcomes (i.e. pass with distinctions). It may be that other factors, other than costs, are in this case more important. Are these schools being managed efficiently? Do they have well-trained teachers and are they being utilised optimally to improve learning? Answers to these questions may provide insights into how schools serving the poor can be managed to improve their efficiency as their funding base is improved.

Figure 5.14. Unit cost and pass rates by school socioeconomic status (Uganda)



5.3. Data Envelopment Analysis (DEA)

5.3.1. Efficiency for different set of outputs

Results of the DEA analysis (Table 5.17) suggests that generally schools are able to achieve high completion and pass rates (the mean efficiency is 0.98 and 0.92, which are closer to the efficient frontier value of 1). This is a measure of how well students progress through the school system and achieve a pass. With DEA, efficiency refers to technical efficiency (see Appendix 1, Section 8.1). So effect, we could argue that secondary schools in Uganda do a good job in getting the majority of its students to complete secondary education and achieve a pass in the final examinations. Generally, pass is a broad category as it excludes fails and distinctions which are the tall ends of the distribution.

Table 5.17. Efficiency for different outputs (Uganda)

	Achievement		Flows
Statistics	Pass rate	Pass rate with distinctions	Promotion and cohort completion rates
Mean	0.92	0.57	0.98
Interquartile range	0.04	0.78	0.03
Standard deviation	0.22	0.35	0.03

Notes: (1) Pass rates refers to the exam at grade 11 for years 2015 and 2016. (2) Flows includes as outputs cohort completion rates (2013-2017) and promotion rates. (3) For further details on the DEA specification and inputs included, see Appendix 1.

However, when we raise the bar in terms of much higher learning outcomes (distinctions), it is noticeable that not many schools approach this efficient frontier –reaching completion at higher learning outcome (distinctions) is 57% as compared to 92% for pass rates. It is much harder for schools to achieve efficient flow and high distinction passes. Moreover, there is a wide variation in efficiency for pass rates with distinctions as standard deviations (SD) are much higher than for pass rates. Based on DEA analysis for pass rates (Table 5.18), we find that more efficient schools −those schools achieving the most distinctions with the highest completion rates− are private Non-USE schools (score of 0.99), although government USE schools are very close (score 0.96). Schools which are clearly further below from this efficiency frontier are private USE schools (low-fee private schools): their mean efficiency score is 0.25 points below the efficiency frontier. This group of schools is also very heterogenous with a large SD.[26]

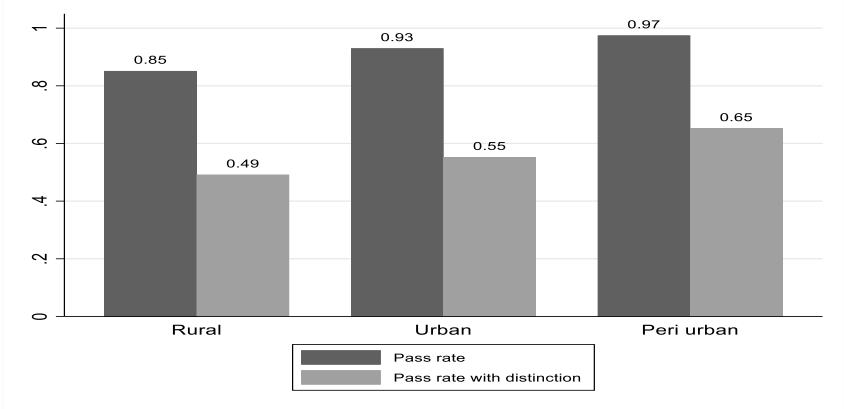
Table 5.18. Efficiency by school type (Uganda)

		Achievement		Flows
School type		Pass rate	Pass rate with distinctions	Promotion and cohort completion rates
Govt Non-USE	Mean	1.00	0.72	0.97
	SD	0.00	0.36	0.03
Govt USE	Mean	0.96	0.57	0.97
	SD	0.07	0.33	0.04
Private Non-USE	Mean	0.99	0.69	1.00
	SD	0.01	0.34	0.01
Private USE	Mean	0.74	0.39	1.00
	SD	0.40	0.38	0.00

[26] The standard deviation is 0.40 for private USE schools, but 0.07 and 0.01 in the other schools.

For the output pass rates with distinction (Table 5.18), government Non-USE schools, on average, are more efficient, achieving higher passing grades than private schools (0.72 versus 0.69, and 0.57 versus 0.39). These results are in line with what we found in terms of teacher quality, barriers to learning and infrastructure by school type in Uganda. Non-USE schools employ more well qualified teachers, have better instructional facilities, charge higher fees and attract relatively well-off students. USE schools have limited instructional families, poor infrastructure, large class sizes, and a high proportion of disadvantaged students. Less efficient schools, both in terms of pass rates and pass rates with distinction, are mostly in rural areas (Figure 5.15). Peri-urban schools are the most efficient with a mean score of 0.97 (pass rates) and 0.65 (pass rate with distinctions). Urban schools sit in the middle in terms of efficiency. Efficiency of rural schools is comparatively low.

Figure 5.15. Efficiency score by location (Uganda)



5.3.2. Costs and Equity - DEA efficiency analysis

Here we examine two issues: (i) the association of technical efficiency with equity, and (ii) the profile of school's technical efficiency alongside cost efficiency.

- A school which has high technical efficiency but achieves this at high costs should not be a target for expansion because the costs would be unsustainable.
- In addition, if technical efficiency is achieved by attracting students from high socio-economic background, then increasing investment in such schools at the expense of schools attracting mostly disadvantaged students would not be a good policy choice.

Important questions that drive our analysis of costs and equity are as follows:

- How much of (technical) efficiency/inefficiency can be explained by the socio-economic background of the students in a particular school? In effect, how much of a school's efficiency is driven by the type of students it enrols?
- Are less privileged schools, for instance, less efficient?

Figure 5.16 suggests some answers. The second panel plot shows that equity[27] is not linked to average pass rates. Most schools' efficiency scores are clustered around 0.90-1.00, though poor schools (high disadvantage) and less poor schools (medium disadvantage) are more heterogenous. Taken as a whole, technical efficiency does not appear to be strongly influenced by equity, perhaps suggesting that resources are more important than the type of students schools enrol.

[27] Note that we are measuring equity at the time of the exam as we are discarding issues related to equity and selection through dropouts from grade 8 to grade 11.

Figure 5.16. Efficiency scores by school degree of disadvantage (Uganda)

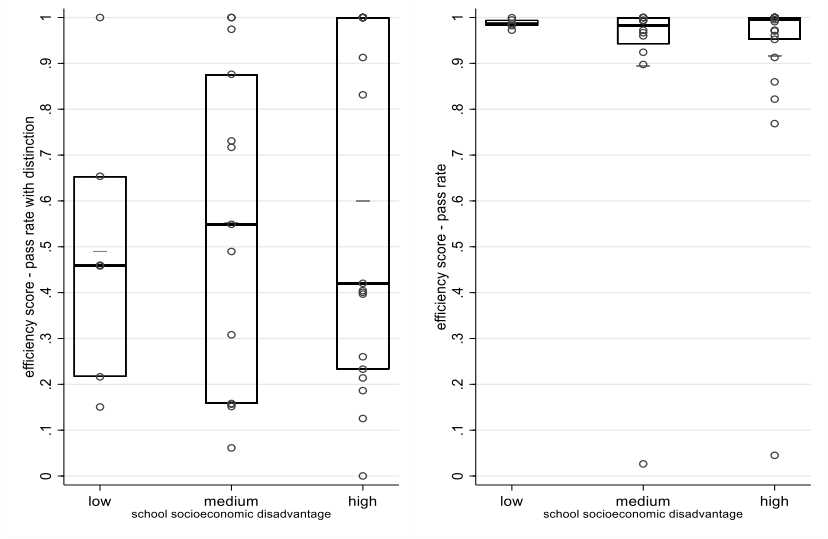


Figure 5.17 shows efficiency scores for each school alongside unit costs. This allows the identification of schools which are technically efficient at what might be described as "reasonable costs". For the output indicator pass rates with distinctions, we observe that low technical efficient schools are also less cost efficient (efficiency score below 0.6 and unit cost above $100). But, it is also clear that some schools are able to achieve high technical efficiency at lower costs; shown by top left quadrant. However, there are few schools that achieve high technical efficiency (score above 0.8) at relatively low costs (below $100).

Figure 5.17. Technical efficiency and cost efficiency (Uganda)

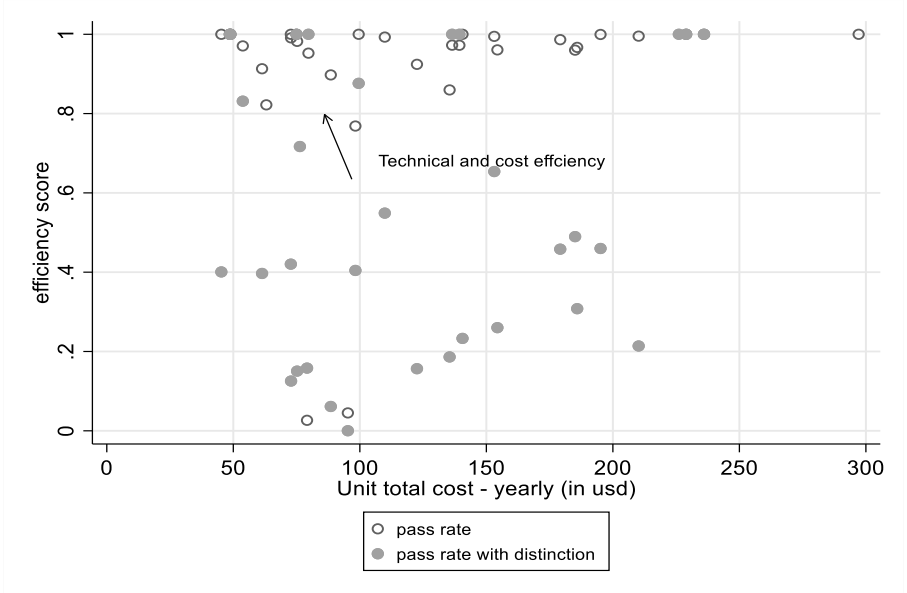
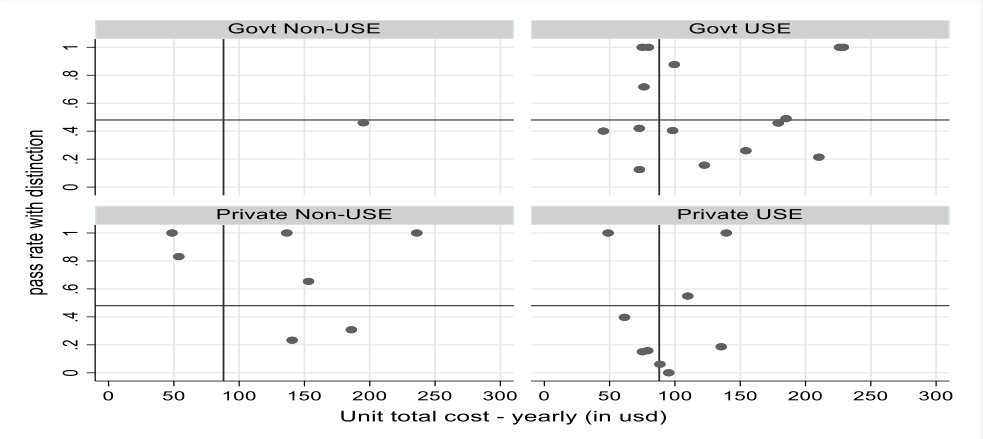


Figure 5.18 displays technical efficiency (TE) and cost efficiency (CE) by school type, this time, based on pass rates with distinction. We divide the figure into four quadrants; these quadrants are defined by the median value of total unit cost (=$88) and the median value for the efficiency score (=0.48). The region where schools achieve technical efficiency and cost efficiency simultaneously and are above the average school is located in the top left corner. In this region there are only six schools (2 private Non-

USE, 1 private USE and 3 government USE), which represents around 16% of the total working sample.[28]

Figure 5.18. Technical efficiency and cost efficiency for pass rates with distinction by school type (Uganda)



5.3.3. Efficiency and teacher characteristics

Analysis of teacher characteristics on school efficiency indicates that experience on the job, age and salary are the most important for teachers working in highly efficient schools (Table 5.19). Thus, schools with high teacher turnover may lose out on the benefits of long teaching experience. It suggests that for schools to improve learning outcomes reducing teacher turnover is key, especially schools in rural areas where turnover is relatively high. Perhaps not surprisingly, in technically efficient schools, teacher salary is more closely linked to teacher experience. This is shown in Table 5.20 by the correlation coefficient between total teaching experience and teacher salary. In relation to pass rates, the correlation coefficient is nearly 40% larger among the most efficient schools and it is 76% larger for completion rate with distinctions.

Table 5.19. Difference on teachers' characteristics for efficient and low efficient schools (Uganda)

	Pass rate				Pass rate with distinction			
Teacher characteristics	Efficient	Low efficiency	Difference	t-test	Efficient	Low efficiency	Difference	t-test
Female	0.74	0.74	0.00	n	0.77	0.74	0.03	n
Age	43.34	42.53	0.82	y	40.33	44.12	-3.79	n
Experience	15.98	17.27	-1.29	y	14.46	17.83	-3.37	y
Experience in current school	5.21	4.83	0.38	y	4.54	4.81	-0.27	y
Salary	170711	152812	17898	y	159768	152812	6956	n

Table 5.20. Correlation coefficient between teacher experience and his/her salary for efficient and low efficient schools (Uganda)

	Efficient	Low efficiency
Pass rate	0.341	0.245
Pass rate with distinction	0.546	0.309

[28] Note that government Non-USE school (one school) is left on the boundary of technical efficiency, but given its large unit cost is not reaching both types of efficiency at the same time.

5.3.4. Characteristics of the most and less efficient schools

We divided schools into two groups: schools which are efficient (with scores equal to 1) and schools which are less efficient (bottom 25% of efficiency score distribution for pass rates) and compared the characteristics of each group to find out what features make a school more or less efficient (see Table 5.21). From the results that are outstanding, we are able to draw the following conclusions:

- Efficient schools are relatively small and have better resources than the less efficient schools. They employ more qualified teachers therefore have more qualified teachers per student (more than double STR for qualified teachers). This profile raises a challenging question for policy – to increase access to secondary education, either governments have to optimise the use of space in small schools or add more facilities to accommodate more students. It is not surprising that small schools with more resources are more technically and cost efficient, but the policy implication is not to go for small schools especially as demand for secondary education grows. It would be better for expand facilities to accommodate new students at the same time increase resources to ensure they deliver good learning outcomes.

- Efficient secondary schools are more likely to have teachers who prepare and use lesson plans than less efficient schools. They also have lower teacher turnover. Again, this is not a surprising result. If, we take preparation and use of lesson plans in teaching as a proxy for high professionalism, then it means increasing teacher professionalism will impact positively on a school's efficiency in terms of learning outcomes. Low turnover is also an indication that schools where teacher professionalism is high are welcoming environments for teachers to work. In these environments, teachers are less likely to leave.

- The mean class size (for key subjects) is half the size for efficient schools than it is for less efficient schools. Efficient schools spend slightly more time preparing students for examinations. What this means in the context of Uganda is that, schools serving predominantly students from disadvantaged backgrouds achieve high learning outcomes by investing more time in preparing students for examinations. However, we also noted that not all schools in this category are able to achieve the same levels of improvement.

- Efficient schools get more feedback on how well they are doing, are more likely to take part in school management programs and have more autonomy on allocation of resources within their school and the number of teachers they need.

- More efficient schools have seen an expansion in enrolment over the last 2 to 4 years. However, this has been accompanied by higher unit cost and ratio of teacher salary to support staff. More efficient schools spend slightly less for each student in total, their wage cost is higher but this is compensated for by an average lower unit cost in infrastructure.

These are characteristics expected of schools that are technically efficient. To improve less technically efficient schools, policies should target these characteristics while ensuring that the increased costs and financing are sustainable.

Table 5.21 Characteristics of the most and less efficient schools (Uganda)

	Efficiency based on pass rates		
	Efficient	Low efficiency	Difference
School enrolment - total	686.3	741.0	-54.71
Ratio of qual vs nonqual teachers	17.8	5.7	12.07
Ratio of teachers total to professional support staff	3.6	3.1	0.53
School students classroom ratio	87.6	64.4	23.17
Student teacher ratio based on qualified teachers	21.6	55.9	-34.35
Headteacher - female	0.5	0.1	0.39
Headteacher - age	46.6	42.3	4.39
Headteacher - education level	2.9	2.4	0.48
Headteacher - years of work experience as principal in total	10.9	9.8	1.08
School administration training	0.9	1.0	-0.07
Financial management training	0.9	1.0	-0.14
Participated in professsional development activities	0.5	0.8	-0.28
Teacher - Hiring of new teacher is responsabnility of school	0.64	0.67	-0.02
Teacher turnover, this year	0.10	0.23	-0.14
Teacher excess	2.12	0.40	1.73
Teacher - Professional development supported	0.64	0.89	-0.25
Teacher - Professional development supported and participated	0.57	0.89	-0.32
Management - Teacher regularly produce lesson plans for inspection	0.43	0.33	0.10
Mean class size (for main subjects)	57.16	117.86	-60.70
Ratio for proportion of school days spent on examinations versus teaching	0.23	0.19	0.05
Proportion of students walking more than 3 km	0.34	0.31	0.04
Proportion of students cycling more than 3 km	0.03	0.06	-0.03
School receives info on how well it is doing - total	1.86	0.44	1.41
The school participated in: Program to support school management	0.50	0.44	0.06
The school participated in: Program to improve teacher performance	0.21	0.44	-0.23
The school participated in: Program to improve student performance	0.00	0.11	-0.11
Autonomy - Preparation of the school budget	2.64	2.89	-0.25
Autonomy - Allocation of resources inside the school	2.79	2.44	0.34
Autonomy - Decide how many teachers the school needs	2.50	2.44	0.06
Autonomy - Decide which teacher teaches at what class level	2.86	2.89	-0.03
Index - IT	-0.20	0.12	-0.32
Index - Infrastructure	-0.04	0.25	-0.29
Enrolment rate growth between 2013 and 2017	3.95	-9.45	13.40
Enrolment rate growth between 2015 and 2017	2.53	-2.53	5.06
Unit wage cost of qualified teacher - per month (in usd)	0.18	0.17	0.02
Unit wage cost - per month (in usd)	8.70	5.52	3.18
Unit expenditure cost - per month (in usd)	0.98	2.10	-1.12
Unit total cost - per month (in usd)	6.95	7.62	-0.68
Ratio of wage to expenditure cost	53.47	17.20	36.27

5.3.5. Summary

The findings of the study into secondary education in Uganda has provided some clear insights into the variation in quality and the need to reduce the variation across schools which is a source of inefficiency. The key findings and the issues they raise are the following:

1. Secondary schools in Uganda vary in quality and efficiency. Many technically efficient secondary schools also have low enrolment.

2. Grouping students by performance or ability is correlated with the aggregate distinctions in most schools at grade 11. Remedial classes boost passing rates where students are from disadvantaged communities.

3. Many secondary schools have unstable sources of income due to heavy dependence on parental-teacher association (PTA) contributions or other charges. This also means that schools in rural areas serving predominantly disadvantaged students are unable to raise the additional funds needed to improve quality of secondary education. This is an important source of ineffiency.

4. There is a significant selection process before exams in secondary schools, especially in Non-USE schools. Superior performance in the national exams by Non-USE students is achieved by repeating underperforming students in the last grade of secondary school. In private USE schools dropout rate is highest at grade 13. Private secondary schools also have high repetition rates which appears to be an attempt to boost examination performance by delaying transition of low achieving students. Students in government schools are not being held up (repeated) before taking the exam at grade 11. However, there is strong selection *after* the final examinations.

5. High student classroom ratio is a greater problem in government schools, especially in government USE schools attended by most students; Government USE schools have more than 80 students per classroom whereas private schools have less than 50 students per classroom. These have an STR of average 40:1 and a SCR of 80. This is an indication of an inefficient workload system in secondary schools. Generally, staff utilization and teaching loads in Uganda secondary schools are very low, which means more resources are not going to solve this problem.

6. Professional development (PD) is a low activity in all secondary schools in the study. Subject-specific uptake of teacher PD is also quite low. Teachers from either government or private Non-USE schools have about a 20-22 percent chance of participating in courses or workshops related to their subjects, while in USE school this is just between 6-9 percent.

7. Computer to student ratio across all the schools is very low (between 2 to 4 PC for 100 students). Also, very few are web-connected PCs for students (less than four for all schools on average).

8. On average, larger unit cost per student is positively correlated with pass rates with distinctions. Most schools achieve the same pass rates but at very different unit costs –a situation which highlights the high variation in efficiency across secondary schools.

9. Government Non-USE schools, on average, are more efficient in achieving higher passing grades than private schools. Non-USE schools employ more well qualified teachers, have better instructional facilities, charge higher fees and attract relatively well-off students. USE schools have limited instructional facilities, poor infrastructure, large class sizes, and a high proportion of disadvantaged students.

10. Less efficient schools, both in terms of pass rates and pass rates with distinction, are mostly in rural areas. Taken as a whole, technical efficiency does not appear to be strongly influenced by equity, an indication that perhaps resources are more important than the type of students schools enrol.

6. Conclusions and Policy Recommendations

Efficiency −either defined in terms of completion rates or completion rates with quality above a threshold (distinction)− is largely related to the type of secondary school and its location. Community day secondary schools serving predominantly students from a relatively lower socio-economic background lack the resources to produce high learning outcomes. Growth in secondary school enrolment through community schools could be achieved by expanding these schools. But clearly, schools would need more investment to ensure quality does not drop. If we measure school efficiency in Uganda based on the output measure of passes in examinations, this gives us little insight into efficiency levels since schools in general achieve high pass rates. Besides, the definition of a pass is quite broad and does not provide sufficient discrimination so that less or more efficient secondary schools can be easily identified. In effect, the output used to measure efficiency matters. We also found that quality secondary education (pass rates with distinctions) is more a school-specific indicator and subject to a larger between-school variation, than efficiency based on completion rates or student flows through the grades.

- A more efficient teacher workload system is required so that schools can maximise the use of teachers time. This will help to reduce costs due to excess teacher requirement.
- Private schools that have opted out of USE policy use their selection and progression policy to maximise their performance in the national exams.
- Public USE schools generally promote all their students through the grades and end up with a more mixed ability range of students taking the final exams. This makes public USE schools more efficient in terms of achieving high progression through the grades, but less so on examination results as an output measure of efficiency.
- Many students in private schools do not start school at the beginning of the term which could be due to higher fees and a reflection of difficulties some households experience paying fees at the start of the term.
- The chances of students dropping out are much higher if a student either attended a Non-USE private school or attends school in an urban area. The relatively higher dropout in Non-USE schools may be due to affordability and or selection out for academic failure.
- Private schools and some public schools are achieving technical efficiency by attracting students from a high socio-economic background. Increasing investment in such schools at the expense of schools attracting mostly disadvantaged students would not be a good policy choice.
- Analysis of teacher characteristics on school efficiency indicates that experience on the job, age and salary are predictive of schools that are technically efficient.
- Reaching both technical and cost efficiency is achievable for all schools relative to a frontier efficiency and regardless of school type. Even those schools that are disadvantaged in terms of resources, facilities and the quality of their workforce can improve their technical efficiency at reasonable costs through better school management and governance practices.
- Households make a considerable contribution to secondary education through PTA charges and other charges. Encouraging parental contribution produces inequitable access to quality secondary education. Unless, the state is willing and able to absorb many of these costs, the poorest in Ugandan society will find it difficult to access quality secondary education. Richer parents provide more to their schools than poorer parents allowing their schools to provide better quality secondary education. It will be more equitable for schools serving students from predominantly disadvantaged backgrounds to receive more in capitation grants so schools have no need for contribution from poor households.
- Staffing schools with more qualified teachers matters for technical efficiency. Introducing policies and incentives that reduce teacher turnover is important. A policy to lower class size for main subjects by discouraging class combination, and increased IT facilities could improve efficiency

levels of many schools. Higher unit costs per student as well as higher teacher salaries and teachers' payment policies more in line with their experience and productivity would also improve quality.

- Teachers' salary is on average 11 percent higher in efficient schools, However, there are limits to what government's can afford in terms of raising teacher salaries across the board. Pay policies linked to teacher productivity (e.g. maximising time teachers spend in actual classrooms teaching, reviewing teacher workload to ensure equity) are strategies that could be considered.
- The number of PCs connected to the internet, PCs for school management and PCs per student are higher in more technically efficient schools. However, the number of PCs available for staff and student use in all secondary schools are woefully inadequate. Improving IT infrastructure and use in schools should be a policy priority. This has the potential to enrich the quality of the secondary school learning experience

There are a number of medium to long-term policy decisions that can address the issues raised by the findings:

1. Expand access to government USE schools (increase school size to at least 500 students) and improve the quality of education they offer by increasing investment in infrastructure –including greater access to web-enhanced technology, reducing class size and improving working conditions, especially in disadvantaged government USE schools to retain experienced trained teachers.

2. Review the teacher workload system to maximise the use of teaching time across the teacher workforce in each school.

3. The importance of technology in improving the quality of education is a well established fact. Secondary schools in Uganda are not putting themselves in the frame to maximise the opportunities that 21st century technology can provide for effective learning. A programme of investment in IT infrastructure and connectivity to the world wide web accompanied with training should be a priority to improve the quality of the student learning experience in secondary schools.

4. From the case study evidence, there appears to be little incentive for schools to become more efficient in their use of resources. More needs to be done to improve accountability in the secondary school sector. Increased accountability should target teachers, school leadership and districts. There needs to be investment to improve school governing boards capacity to manage schools efficiently

5. There are clearly constraints on effective management of schools because of the inability to provide adequate capitation on time. Schools have to rely on unstable PTA or parent contribution to fill the funding gap. A school's efficiency then becomes a function of the stability of external funding, and would make it difficult for effective planning to improve quality at the school level.

6. The reliance on capitation to pay for additional teachers or hire part-time teachers needs to be reviewed. Although guidelines stipulate that this should not exceed 20 percent of capitation, there are no incentives for schools to apply this rule. Government USE schools sometimes have on their teaching staff about 50 percent privately hired teachers on the school's payroll. In other words, these are teachers who would be paid using capitation and/or PTA contributions.

7. There needs to be a robust inspection and advisory system in place to ensure that all secondary schools including private schools meet minimum standards of practice considered appropriate. Strategic regulation is needed to guide the professional development of secondary schools within each of the different types of school bearing in mind the different patterns of administration, ownership, financing, and accountabilities. The State would have to improve its capacity to monitor schools and be prepared to increase its own budget to support a system of monitoring and evaluation to improve quality and efficiency of secondary education.

8. The Directorate of Standards Agency (DES), set up to inspect schools and check whether they are run efficiently and are focused on their core mandate of providing quality education is critical. An effective DES would ensure that schools are functioning efficiently. The DES should set standards that would motivate schools to operate more efficiently. A system of monitoring and evaluation where schools are appraised and those delivering quality education are recognised in inspection reports is one way of incentivise better management practices. At the moment, there are no clear standards or benchmarks that stipulates the basic requirements and norms for efficient performance of secondary schools. Norms for provision and registration should go beyond inputs to process measures.

9. There are indirect political economy issues arising from the findings of the research. Creating a secondary school system that works to improve quality for all will be achieved if ecosystem factors that influence how schools are run are given the needed attention. School governing boards must have real power to manage schools and hold headteachers and teachers to account in the use of resources and performance. Headteachers also need training in managing secondary schools and given more autonomy.

10. Accessing data for the analysis of school efficiency and effectiveness demonstrated the need for systematic data on secondary education in Uganda that is comprehensive to improve decision-making on investment to provide equitable quality secondary education. This also has implications for how schools can improve. The lack of school efficiency data readily accessible to school governing boards means it will be difficult for them to make informed decisions that can improve their efficiency and effectiveness. At the national level, improved database on secondary schools will be useful in monitoring performance and promoting policies that deliver quality secondary education for all.

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8. Appendix 1. Efficiency conceptualisation and framework

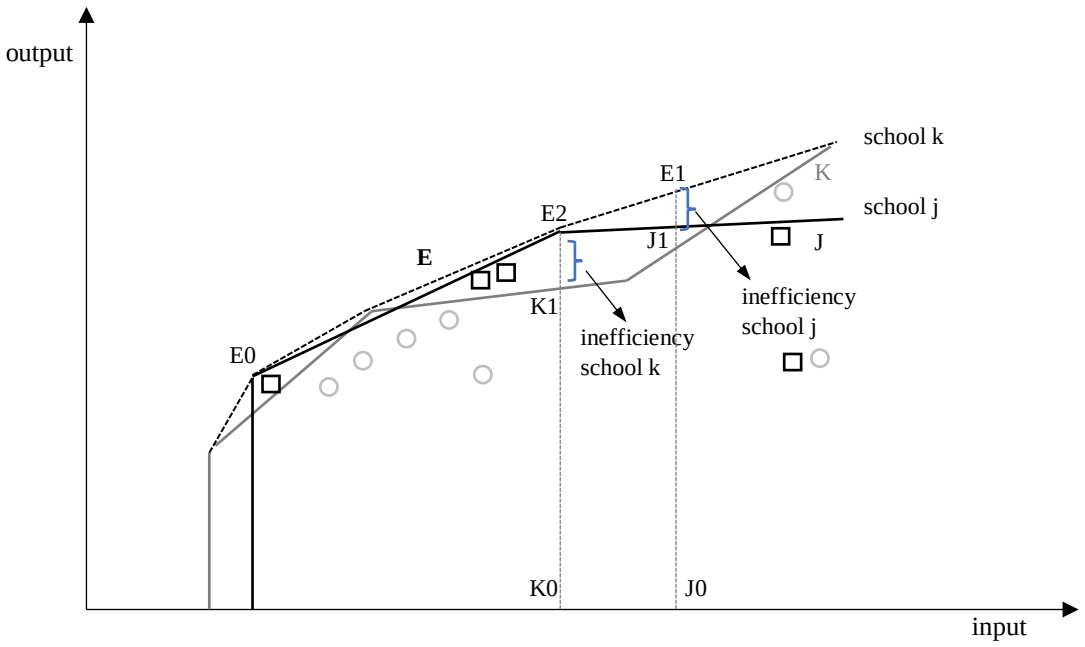
8.1. Data Envelopment Analysis (DEA)

The DEA consists of building an envelope of the most efficient combinations of inputs and outputs by solving a linear optimization program (Farrell, 1957; Charnes et al., 1978). The efficient combination of inputs and outputs of a given decision making unit (often a firm but in our context a school) define a production frontier, which defines a standard performance and the evaluation of each unit is with respect to that standard. That is, the DEA calculates the boundary of the best productive practice possible and estimates an efficiency parameter that is a result of the distance of the unit with respect to the frontier. There are other assumptions within DEA like convexity of production function, type of return to scale etc.

There are two types of efficiency one could measure within DEA: with respect to outputs or with respect to inputs. In the latter, it implies the reduction one could achieve in inputs without modifying the level of output (on the frontier) and in the former case to obtain the maximum level of output given a fixed level of inputs. We follow the second approach –that is, an output orientated maximisation.

Graphically, let assume there are two schools: school *j* with a combination of inputs (say teacher numbers, PCs, and infrastructure) and outputs (say of learning scores) given the frontier of production *J* (Figure 8.1). There is a second school *k*, with a frontier *K*. Each frontier represents the maximum output for a given set of input where each dot represents a student (which a specific learning score/output). Now, combining these two frontiers with DEA gives a new envelope efficient frontier for the two schools *E*. The distance J1E1 is the inefficiency of school *j* with respect to efficient frontier; the distance K1E2 is the inefficiency of school *k* with respect to the efficient frontier. The relative efficiency is the ratio J0J1/J0E1 for school *j*, and for school *k* is K0K1/K0E2. If the ratio is one, schools are using a combination of inputs and outputs on the absolute efficient frontier, hence they are efficient reaching the maximum output for their set of inputs. This ratio can be defined as λ. The further the relative efficiency or λ is from one, the less efficient a school is. Here, we assume that λ is measuring technical efficiency: how inputs are transformed into outputs.

Figure 8.1. A graphical representation of efficiency - DEA



DEA assumes the existence of a production possibilities frontier (the envelop) that defines which linear combination of observed input-output bundles are feasible. The relative efficiency of unit j can be defined as weighted outputs (r) to the weighted inputs (i): $e_j = \sum_r \bar{u}_r y_{rj} / \sum_i \bar{v}_i x_{ij}$, where $\bar{u}_r$ and $\bar{v}_i$ are the prices of outputs (y) and multipliers of inputs (x). Because multipliers are unknown, linear programming problem generates the multipliers as a by-product of the statistical estimation process. The "output-oriented envelopment" program that aims to maximize the output production of each decision-making unit (DMU) (e.g., a school) subject to a given input level can be formulated as follows. Let's consider the problem for DMU 1,

$$max\delta_1 \qquad (\text{and } \delta_1 \geq 1) \qquad (8.1)$$

$$\sum_j \lambda_j y_{rj} \geq \delta_1 y_{r1} \qquad r = 1, \dots, s \qquad (8.2)$$

$$\sum_j \lambda_j x_{ij} \leq x_{i1} \qquad i = 1, \dots, m \qquad (8.3)$$

$$\sum_j \lambda_j = 1 \qquad (8.4)$$

$$\lambda_j \geq 0 \quad \forall\, i, j, r \quad \text{and} \quad \delta_0 \text{ unconstrained} \qquad (8.5)$$

The solution is given by (8.1) which represents the output-efficient score. It indicates the proportion by which the *s* outputs need to increase for DMU1 to be located on the production possibility frontier. In other words, it measures "technical efficiency" as the distance to the production frontier. If $\delta_1 > 1$, the DMU1 would be located inside the frontier, i.e. it is inefficient, and if $\delta_1 = 1$, DMU1 is efficient as it is located on the frontier. Equation (8.2) is the output constraint, indicating that the weighted sum of outputs from all DMUs in the sample must be greater than or equal to the potential output for DMU1, given the input constraint (Equation 8.3). There indicator λ_j is a constant representing the weights with which the DMU replicates the behaviour of the others DMUs in regards the use of inputs to produce outputs. This sum must be less or equal than the input available for DMU1. Each λ_j is applied to compute the location of an inefficient DMU if it were to become efficient. The maximization problem is solved as many times as DMUs in the sample.

Our empirical approach uses two outputs (and three formulations: pass rates, distinctions and flows) and four inputs (Table 8.1). Note that both inputs and outputs must be positive. We estimate the model using a radial measure of technical efficiency and variable returns to scale (VRS).

Table 8.1. Data Envelopment Analysis (DEA) specification

Outputs			Inputs	
Pass rates	y11	pass rates for year 2015	x1	student teacher ratio
	y12	pass rates for year 2016	x2	student PC ratio
	y21	pass rates with distinction for year 2015	x3	teacher PC ratio
	y22	pass rates with distinction for year 2016	x4	school infrastructure
Flows	y31	cohort completion rates (2013 - 2017)		
	y32	promotion rate (100 - dropout - repetition)		

Notes: (1) Pass rates refer to the exam at grade 11. (2) School infrastructure is calculated as the student's ratio for the following infrastructure items: number of laboratories, number vehicles, number of students per dormitory and number of in use toilets.

As explained above, through DEA we estimate technical efficiency, that is, we are able to find which schools falls into the set of efficient schools. This is the first part of the argument: finding schools located in the set TE of Figure 4.1 (see Section 4). We discuss the other set of efficiency, cost efficiency, and the overlap of the two types of efficiency below.

8.2. Cost efficiency

Achieving learning outcomes implies some unit cost for a school composed by the teaching workforce payments and the expenditure related to infrastructure of the school. This total cost can be transformed into a unit cost by dividing by the total enrolment of the school. If a school achieves a given value of learning outcomes (say, a pass rates) at a higher cost than a comparable school, then it can be said that this schools is cost inefficient. Alternatively, if the school achieves the same level of learning outcome at a lower cost, then it can be said the school is cost efficient.

It should be noted that, here, we are not dealing with the issue of technical efficiency (which is provided by the DEA) as we only focus on cost and learning outcomes. Here we are focusing on the efficiency of DMU (schools) in the set describe by CE in Figure 4.1; this set can or cannot overlap with the group of technical efficient DMU (schools).

Another definition, beyond comparison at the same level of cost or the same level of learning outcomes across schools to establish whether a school is either cost efficient or not, is how the degree of cost efficiency varies across schools that spend more or less. That is, what is cost efficiency gradient (increase of learning over unit increase on costs) across the distribution of costs. This is important from the point of view of finding at which level of (unit cost) further increase do not contribute to larger cost efficiency because of decreasing returns to school expansion activities.

Figure 8.2 Cost efficiency

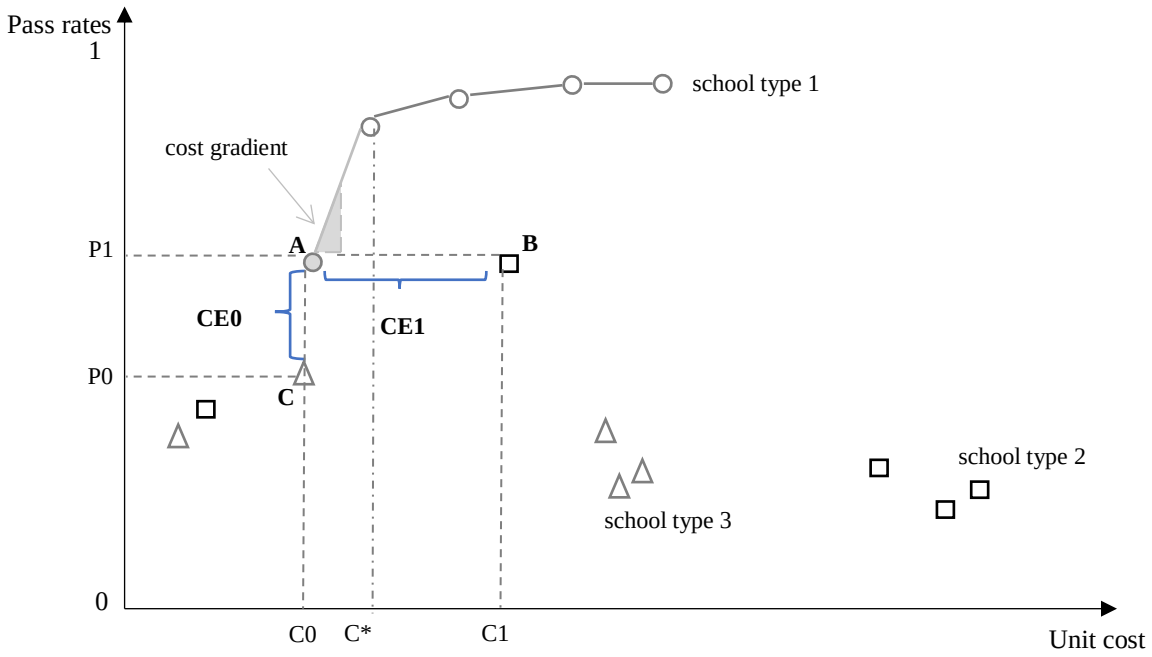


Figure 8.2 presents these different cost efficiency scenarios. We plotted 15 schools, 5 for 3 different school types (each type denoted by circles, squares and triangles). The y-axis represents pass rates and the x-axis unit total cost. School A is more cost efficient than school B as it reaches the same level of pass rate P1 but a lower unit cost (the difference of C1 minus C0). The cost efficiency here is CE1 (and

in relative terms CE1/ C1). Likewise, school A is more cost efficient than school C because it obtains at the same cost C0 a larger pass rates (the difference between P1 and P0). The cost efficiency here is CE0 (and relatively as a ratio CE0/P1). Additionally, looking at school of type 1 (hollow circles) we can see that increasing unit cost leads to larger pass rates. But the increase on pass rates for unit increase of costs (the gradient) diminishes from the level of unit cost C*. Hence, it is not cost efficient for schools with a profile of cost as those from school type 1 to incur in unit cost above this threshold. The figure also shows that school type 2 are the less efficient (e.g. same pass rate but larger cost than school type 3, bottom right of figure).

8.3. Technical efficiency and cost efficiency

Here we present how one could empirically find those schools which are technically efficient and cost efficient at the same time. These schools are shown by the intersection of the TE set and the CE (Figure 4.1) and shows cases where affordable efficiency increases can be located. These are cases like school A (Figure 8.2) with estimate technical efficiency on the frontier of maximum possibilities given the set of outputs ($\delta = 1$).

Figure 8.3. Technical and cost efficiency

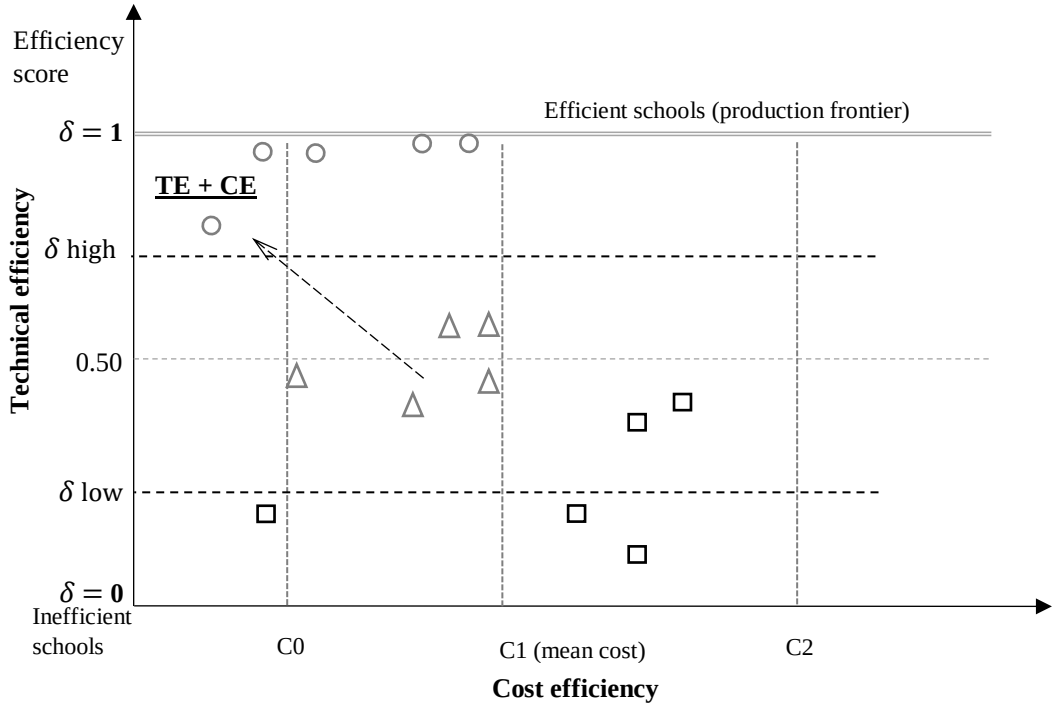


Figure 8.3 includes a scatter plot of the estimate efficiency score for each school alongside the unit cost for each school. Recall that δ=1 are technically efficient schools, in the frontier, and when δ tends to zero schools are less efficient. Ideally all schools would like to move toward the region TE+CE where technical and cost efficient are achieved, because the score of efficiency is high (above δ high) and the unit cost is low (below C0). Note that the same comparison by either fixing a level of efficiency score and comparing costs across schools or fixing the unit cost and compare efficiency score permits to identify cases where either one or both type of efficiency can be raised in parallel.

9. Appendix 2. Questionnaire

UNIVERSITY OF SUSSEX

IMPROVING EFFICIENCY AND EFFECTIVENESS OF SECONDARY EDUCATION IN AFRICA (EESSA) Research Project

QUESTIONNAIRE – UGANDA

IMPROVING EFFICIENCY AND EFFECTIVENESS OF SECONDARY EDUCATION IN AFRICA RESEARCH PROJECT (EESSA)

This questionnaire is divided into five parts:

Part I: Background questions about the school
Part II: Background and questions about headteacher
Part III: Questions about secondary school teachers, technology and management
Part IV: Questions on enrolment, transitions, achievement and trends
Part V: Questions on infrastructure, facilities and expenditure

Preface

What is the survey about?

This survey is being administered in Malawi and Uganda to understand in each country the factors that contribute to the efficiency of secondary education in sub-Sahara Africa to improve students' academic performance

How will the information be used?

Your information will help us to understand the key issues that relate to efficiency and effectiveness of secondary schools in Uganda
You will receive a summary of the information collected in your country so that you can compare your situation to other schools in the country where secondary education is provided.
For further information on this research and any other questions, you may contact Dr. John Sentongo (0704513115), the Country Lead Researcher
or Professor Kwame Akyeampong of the Centre for International Education University of Sussex (a.akyeampong@sussex.ac.uk), the Principal Investigator who leads this research project.

How should you respond to this questionnaire?

The questionnaire should be completed by the headteacher or delegated official. Some of the questions ask information
about which you may have to consult staff members in your school. Once you have all the necessary information, the questionnaire should take about 45 to 60 minutes to complete.
If you do not know an answer precisely, your best estimate will be adequate for the purposes of this survey. An enumerator from the research team will be on hand to assist in filling the questionnaire

Your answers will be kept strictly confidential. All information that can identify you or your institution will be removed and not identifiable in the final report. Thank You!

0

Country	Uganda
Region	
District	
County	
Sub-county	
Parish	
Village	

Examination Center ID					
School					
Postal address					
Tel.					
Headteacher or delegate	1. Name:		2. Tel	3.Email address:	
		Permission to use telephone		Yes / No	
Full names of surveyors	1. Name:		2. Surname:		
	3. Tel:		4. Email address		
Date:	Time of arrival:		Time of departure:		

Part I: BACKGROUND AND QUESTIONS ABOUT YOUR SCHOOL

1 What is the school type?

Mark only one

a Government aided
(This is a school where government provides support including salaries)

Non-USE	USE

b Private school
(This is a school where salaries are not paid by the government)

Non-USE	USE

2 Is your school a boys only, girls only or mixed school?

Mark only one

Boys	Girls	Mixed

3 About what percentage of your total funding for a typical school year comes from the following sources?

a How much from paid fees		%
b Other charges (exams, costs of textbooks, uniform, food, etc.)		%
c Donations (e.g. Parent Teacher Association (PTA) contributions)		%
	100	%

4 Which of the following best describes the area in which your school is located

Mark only one

A <Rural area>	
A <Small town>	
A <Town>	
A <City>	
A <Peri urban>	

5 Think about the level of wealth of the area where this school is located. What proportion of students are from socioeconomically disadvantaged homes?

Mark only one

(Socioeconomically disadvantaged homes' refers to:
-homes lacking the basic necessities or advantages of life, such as adequate housing, nutrition or medical care or in terms of the towns or parental profession of students)

	1% to 33%	34% to 66%	67% to 100%
Students from socioeconomically disadvanatged homes			

6 Based on your records for 2017, how many students were enrolled in each class?

a Boys

	Class					
	1	2	3	4	5	6
2017 enrollment						

b Girls

	Class					
	1	2	3	4	5	6
2017 enrollment						

7	**Looking at your records for the last school year, how many students have dropped out or repeatead in each class?**

a Boys

Class	Dropped out	Repeated
1		
2		
3		
4		
5		
6		

a.1. If there are dropouts, the common reasons for dropout for boys are

a.1.1 Lack of school fees	
a.1.2 Indiscipline at school	
a.1.3 Mistreatment at home	
a.1.4 Death of parent or guardian	
a.1.5 Other (specify)	

b Girls

Class	Dropped out	Repeated
1		
2		
3		
4		
5		
6		

b.1. If there are dropouts, the common reasons for dropout for girls are

b.1.1 Lack of school fees	
b.1.2 Indiscipline at school	
b.1.3 Mistreatment at home	
b.1.4 Death of parent or guardian	
b.1.5 Pregnancy	
b.1.6 Other (specify)	

8	**What subjects are offered in this school?**

a Bioloy	
b Chemistry	
c Physics	
d Mathematics	
e English	
f History	
g Geography	
h Commerce	
i Agriculture	
j Luganda	
k Physical Education	
l Fine Art	
m Christian Religious Education	

n Entrepreneurship	
o Other (specify)	

9 How many students were enrolled ....

	Boys	Girls
a Total enrolment in the school in the first day of this school year (2017)		
b At the end of the first school term		

10 For each position listed below, provide the number of staff (full-time and part-time) currently working in your school

If a full-time person is working in more than one position (e.g. a librarian, or deputy headteacher with teaching status), include that person in the category where he/she spends the larger part of the statutory working time.

	In the whole school	
	Full-time	Part-time
a. Male		
a.1 School management personnel (headteacher, deputy headteacher)		
a.2 Qualified teachers (with teaching certification)		
a.3 Unqualified teachers (has no teaching certification)		
a.4 Professional support staff		
a.4.1. Bursar		
a.4.2. Secretary		
a.4.3. Librarians		
a.4.4. Laboratory technicians		
a.4.5. IT support staff		
a.5 Other support staff		
a.5.1. Caretakers		
a.5.2. Cleaners		
a.5.3. Gardeners		
a.5.4. Security guards		
a.5.5. State managers		
b. Female		
b.1 School management personnel (headteacher, deputy headteacher)		
b.2 Qualified teachers (with a teaching certification)		
b.3 Unqualified teachers (has no teaching certification)		
b.4 Professional support staff (e.g. guidance counsellors, secretaries, bursar, librarians, laboratory technicians, IT support staff etc.)		
b.4.1. Bursar		
b.4.2. Secretary		
b.4.3. Librarians		
b.4.4. Laboratory technicians		
b.4.5. IT support staff		
b.4.6. School nurses		
b.5 Other support staff		
a.5.1. Caretakers		
a.5.2. Cleaners		
a.5.3. Gardeners		
a.5.4. Security guards		
a.5.5. Estates managers		

END OF PART I

Part II: BACKGROUND AND QUESTIONS ABOUT HEADTEACHER

11 Are you female or male?

Female	
Male	

12 How old are you?

	years

13 What is the highest level of formal education you have completed?

Mark with an X only one option per row

Diploma	
Degree	
Higher - Masters or above	

14 Do you have a teacher qualification from a teacher education institution?

Mark with an X only one option per row

	Yes
	No

15 How many years of work experience do you have?

Please write a number in each row. Count part of a year as 1 year.

a	As a headteacher at this school	years
b	As a headteacher in total	years
c	In other school management roles (do not include years working as a headteacher)	years
d	As a teacher in total (include any years of teaching)	years
e	Working in other jobs	years

16 How were you appointed as headteacher of this school?

Mark with an X one or more options below.

a	By public advertised position	
b	By choice of board of governors	
c	Through transfer by the Ministry of Education and Sports	
d	By decision of school owner	
e	By joint decision of the board of governors and the Ministry of Education and Sports	

17 Did the formal education you completed include the following and, if yes, was this before or after you took up a position as headteacher?

Mark with an X only one option per row

		Before	After	During	Never
a	School administration or headteacher training programme or course				
b	Teacher training/education programme or course				
c	Leadership training or course				
d	Financial management				

18 In the last year, did you participate in professional development activities aimed at you as headteacher, and if yes, for how many days?

Mark with an X only one option per row

	Yes	No	Number of days
a In a professional network, mentoring or leadership training			
b In courses, conferences or observational visits			

19 How do you agree or disagree that the following present barriers to your participation in professional development?

Mark with an X one choice in each row

	Strongly disagree	Disagree	Agree	Strongly agree
a Professional development is too expensive/unafforable				
b There is a lack of employer support for professional development				
c Professional development events conflict with my work schedule				
d Family responsibilities make it difficult for me to attend professional development activities				
e There is no professional development offered by government				
f There are no incentives for participating in professional development activities				
g Distance to centres of professional development is an issue				
h There isn't enough information about available opportunities				

END OF PART II

Part III: QUESTIONS ABOUT SECONDARY SCHOOL TEACHERS, TECHNOLOGY, MANAGEMENT

20 Please provide the following information for all teachers at this school

Teacher name (two initials)	Teacher number	Gender	Age	Teacher rank	Total teaching experience (years)	Teaching experience in the current school (years)	Subject	Classes taught	Qualification	Approx. salary a month (local currency)	
										Government salary	PTA/Board of Governor's contribution

21 Is the hiring of new teachers at your school the responsibility of the school? (e.g. the headteacher's or the department heads')

If teachers are assigned to your school by an external agency, e.g., a government agency or school district, the answer to this question should be 'No'

Mark with an X only one option.

	Yes
	No

22 Teacher's turnover

Please answer this and the following question even if hiring teachers is the responsibility of another organisation (like the local or regional school authority)

If none, write '0'

	Appointed		Left
	Government	School	
a How many teachers were appointed last year and how many left?			
b How many teachers were appointed this year and how many left?			

c How many teachers were appointed last year and how many left for each subject?	Appointed		Left
	Government	School	
c.1 Biology			
c.2 Chemistry			
c.3 Physics			
c.4 Mathematics			
c.5 English			
c.6 History			
c.7 Geography			
c.8 Commerce			
c.9 Agriculture			
c.10 Luganda			
c.11 Physical Education			
c.12 Fine Art			
c.13 Christian Religious Education			
c.14 Entrepreneurship			
c.15 Other (specify)			

d How many teachers were appointed in the last 3 years and how many left for each subject?	Appointed		Left
	Government	School	
d.1 Biology			

d.2 Chemistry			
d.3 Physics			
d.4 Mathematics			
d.5 English			
d.6 History			
d.7 Geography			
d.8 Commerce			
d.9 Agriculture			
d.10 Luganda			
d.11 Physical Education			
d.12 Fine Art			
d.13 Christian Religious Education			
d.14 Entrepreneurship			
d.15 Other (specify)			

23 Which of the following methods were used to cover these vacancies?

Tick one box in each row

	Yes	No
a Subject we offer was cancelled		
b No action was taken		
c Topics (subject content) were added to other teachers' normal teaching hours		
d Some classes were combined		
e Part time teacher was hired		

24 In which subject areas is it difficult to hire a fully qualified teacher in your experience?

Tick one box in each row

	Yes	No
a Bioloy		
b Chemistry		
c Physics		
d Mathematics		
e English		
f History		
g Geography		
h Commerce		
i Agriculture		
j Luganda		
k Physical Education		
l Fine Art		
m Christian Religious Education		
n Entrepreneurship		
o Other (specify)		

25 What is the class size for each subject?

	S1	S2	S3	S4	S5	S6
	Number	Number	Number	Number	Number	Number
a Biology						
b Chemistry						

c Physics						
d Mathematics						
e English						
f History						
g Geography						
h Commerce						
i Agriculture						
j Luganda						
k Physical Education						
l Fine Art						
m Christian Religious Education						
n Entrepreneurship						
o Other (specify)						

26 Which ways does your school support or encourage the <professional development> of teachers?

By professional development (PD) we mean any activity that develops an individual's skills, knowledge, expertise and other characteristics as a teacher. These include formal courses as well.

Tick one box in each row

	Yes	No
a The school has a separate budget used for the professional development of teachers		
b The school provides time for teachers to go on professional development courses (e.g. by building in professional days within the regular school year; by organising replacement for teachers attending courses)		
c The school organises staff development activities (e.g., peer observation of classes, mentoring of young teachers, workshops on teaching subjects.)		
d The school collects and circulates information on professional development courses in the district		
e Teachers are allowed time for professional development which they pay for by themselves		

27 Consider the past school year. To what extent have teachers participated in professional development activities?

Tick one box in each row.

	Not at all	Sometimes	A lot
a Subject related professional development activities			
b Non subject related professional development activities			

28 Consider the past school year. Did any of the teachers in your school participate in the following kinds of <professional development activities>

Tick one box in each row.

	Yes	No	N/A or don't know
a Courses or workshops on subject matter, methodology and other education related topics			
b Conferences/workshops where teachers present their teaching ideas and discuss educational problems			
c Degree programme (e.g. qualification programme e.g. Master's)			
d Observational visits to other secondary schools			
e Regularly-scheduled collaboration among teachers on issues of instruction (do not include administrative meetings)			
f Mentoring and/or peer observation and coaching as part of a formal arrangement that is recognised or supported by the school or educational authorities			
g Participation in a professional network of teachers (e.g., one organised by an outside agency or over the Internet)			

29 Teacher management

Tick one box in each row.

	Yes	No
a Teacher regularly produce lesson plans for inspection		
b Does your school have records of teacher attendance		

c It is difficult to know when a teacher is absent from school		
d A system of appraisal is in place for all teachers		

e What are the most common reasons for absence	Yes	No
e.1 Attending Funeral		
e.2 Sickness		
e.3 Family Responsibilty		
e.4 Casing Salary		
e.5 Other (specify)		

30 How many school days do you have in a year

	Number
a Last year	
b Of these school years, how many days was the school closed?	

31 On average what proportion of school days are spent on the following

a Teaching		%
b Examinations		%
c Sporting activities		%
d Music, Dance and Drama		%
e Waiting time after examinations		%
f Other (specify)		%
	100	%

32 How often are the following factors considered when students are admitted in your school?

Tick one box in each row

	Never or rarely	Sometimes	Often or always
a Whether they are resident in the catchment area of the school			
c Entrance examination			
c Whether student's parents were former students			
d Performance in a previous school			
e Whether student is from a socio-economically poor background			

33 For day students: means of transport and distance of residence to school

a Mean of transport. What proportion travel by:

Car/comuter tax		%
Bus		%
Motorcycle		%
Bicycle		%
Walking		%
	100	%

b Average distance of residence to school

0-1 Km		%
1-3 Km		%
3-5 km		%
5+ km		%

	100	%

34 In general, how often does your school group students using the following methods

Tick one box in each row

	Never or rarely	Sometimes	Often or always
a Students are grouped according to their choice of programme or subjects (e.g. General science)			
b Students are grouped based on their performance in the various subjects			
c Students grouped on basis of their abilities in school subjects			

35 Does your school keep the following records?

Tick one box in each row

	Yes	No
a Disciplinary records		
b Teachers scheme of work		
c Teachers lesson plans		
d Student performance in school (e.g. scores on tests and assignments)		
e Student absenteeism		
f Results of final examinations		
g Health records		

36 What does your school do about students who are underperforming?

Tick one box in each row

	Yes	No
a Ask them to repeat		
b Offer remedial classes		
c Move them to another school		
d Involve parents		
e Do nothing		

37 Does your school receive information on how well it is doing from one or more of the following

Tick one box in each row

	Yes	No	N/A or don't know
a Regional, national education authorities (e.g. inspectorates)			
b The district education office			
c External examination boards (students' results)			
e Parent groups (e.g. School Governing Board, Parent Teacher Association)			
f Teacher groups (e.g., Staff Association, trade union)			
g Alumni Groups			

38 In this school year, has the school participated in any of the following programs?

Tick one box in each row

	Yes	No
a Program to support school management		
b Program to support teacher competences		
c Program to improve student performance		

Information technology

Questions 41 to 46 ask about the use of information technology in your school.

'Computers' in this section include computers capable of supporting other multimedia equipment such as a CDROM and a sound card. Pocket computers or computers used only for recreation should be excluded from the answers. Educational purpose in this section refers to the use of computers for planning, organising, and evaluating student learning, and the use of computers as a teaching and learning tool. E.g. retrieving demonstration material from the <internet>, editing of information, preparing demonstration material, preparing tasks and tests, correcting student work, demonstrating and practicing of information search on the <internet/www.>, etc.

39 How many computers (workstations) are in your school?

Write a number in each row. If 'none', write 0.

	Number
a Available for headteacher's office	
b Available in the school altogether?	
c Available for students altogether	
d Available only for final year students?	
e Available only for teachers' use?	
f Available only for the administrative staff	
g Connected to the Internet/World Wide Web? (www)	
h Connected to a local area network (LAN, Intranet)?	

40 How many computers would be adequate for your school?

	Number
a Students	
b Teachers	
c Management	

41 What has prevented the school from having all the computers the school needs?

Mark with an X one or more options below.

a Lack of funding	
b Lack of internet connectivity	
c Lack of electricity	
d Lack of expertise to use them	
e Other (please specify)	

42 Do teachers at your school use….

Tick the box in each row.

	Never or almost never	Occasionally	Frequently
a Computers for educational purposes? e.g. use computer in classroom as a medium of instruction, for demonstration purposes, as a learning tool, process results etc.			
b The world wide web (WWW)/internet for educational purpose? e.g. to collect demonstration material, to teach information search, to network students with students, etc.			
c <e-mail> for educational purposes? e.g., to send and receive homework, give feedback to students, etc			

43 How much are computers used by students on a regular basis

Tick one box in each row

	Not at all	A little	A lot
a To learn and work during lesssons			
b To obtain information from the Internet			

44 Do you consider any of the following an obstacle for using IT in your school?

Tick one box in each row

	Obstacle	Not an obstacle
a Insufficient number of computers for teachers' use		
b Insufficient number of computers for students' use		
c Outdated computers (older than 3 years)		
d Shortage of maintenance and technical support		
e Not enough copies of software for instructional purposes		
f Not enough variety (types) of software		
g Poor quality of available software		
h Difficult to integrate computers into classroom instruction practices		
i Internet connection not available		
j Difficult to use with low achieving students		
k No time in the school schedule for using the <Internet/WWW>		
l No time in teachers' schedule to explore opportunities for using the <Internet/WWW>		
m Lack of interest/willingness of teachers to use computers		
n Teachers' lack of knowledge/skills in using computers for instructional purposes		
o Not enough training opportunities for teachers		
p Lack of support from the school governing body or community		
q Weak infrastructure (telecommunications, electricity, etc.)		

45 Please indicate your level of agreement with the following statements regarding your experience in this school

Mark with one X only one option in each row.

	Strongly disagree	Disagree	Agree	Strongly agree
a Decision making in this school is a shared responsibility between my self, the deputy head and teachers				
b Former students of the school provide financial and material assistance to the school				
c I have the quality of teachers to achieve good results				
d It is easy to attract teachers to teach in this school				
e The school governing board has the capacity to support management of this school				
f The school governing board has access to resources to support management of this school				
g It is difficult to hold teachers to account in this school				
h I manage the school with little input from other staff.				
i The teachers in this school take a big part in how it is managed.				
j The school would find it difficult to operate without financial contributions from parents				
k The size of the student population makes it difficult to manage this school well.				

46 Please indicate your level of agreement with the following statements regarding your experience in this school

Mark with one X only one option in each row.

	It is a decision exclusively taken by the school	It is a decision shared between the school and people external to it	It is a decision exclusively taken by outsiders
a Selection of teachers to be hired			
b Dismissal of teachers			
c Initial salaries of teachers			
d Salary increases of the teachers			
e Preparation of the school budget			

f Allocation of resources inside the school			n/a
g Establish disciplinary policies of the students			
h Establish policies for assessing students			
i Admission of students to the school			
j Determine the time allocated to subjects on the school timetable			
k Decide how many teachers the school needs			
l Decide on teacher transfer			
m Decide the composition of the school management or governing board			
n Decide infrastructural needs of the school			
o Decide which teacher teaches at what class level			

END OF PART III

Part IV: QUESTIONS ON ENROLMENT, TRANSITIONS, ACHIEVEMENT AND TRENDS

47 **How many students enrolled in the following years?**

a Boys

Year	Number enrolled
2013	
2014	
2015	
2016	
2017	

b Girls

Year	Number enrolled
2013	
2014	
2015	
2016	
2017	

48 **How many students enrolled in 2013 progressed up to 2017?**

Fill each corresponding cells

Year	Numbers	
2013	enrolled	
	dropout	
	repeated	
2014	promoted to 2014 from 2013 cohort	
	dropout	
	repeated	
2015	promoted to 2015 from 2013 cohort	
	dropout	
	repeated	
2016	promoted to 2016 from 2013 cohort	
	dropout	

	repeated		
2017	2013 cohort starting in 2017		

49 The following questions ask about students in Senior 4

Consider the following school years and answer the following questions for each of them 2016; 2015; 2014, 2013.
Even if you do not have an official record, please provide your best estimate, if you have information

	Number of students			
	2016	2015	2014	2013
a How many students were ENROLLED in Senior 4 for each of the following years?				
b How many students REACHED AND SAT the exam?				
c How many students PASSED the exam?				
d How many students PASSED WITH DISTINCTION (grades 1 and 2) in the exam?				
e How many students REPEATED the final year?				

50 For the last two academic years provide the following student information for students of Class 6

Academic year 2016

Subject	Enrolled	Took the exam	Grade achieved								
			Distinction (1-2)		Credits (3-6)				Pass (7-8)		Fail
			1	2	3	4	5	6	7	8	9
All											

Academic year 2015

Subject	Enrolled	Took the exam	Grade achieved								
			Distinction (1-2)		Credits (3-6)				Pass (7-8)		Fail
			1	2	3	4	5	6	7	8	9
All											

END OF PART IV

Part V: QUESTIONS ON INFRASTRUCTURE, FACILITIES AND EXPENDITURE

51 The following questions refer to your school infrastructure and facilities

a Number of classrooms by class

Class	Boys - number enrolled	Girls - number enrolled	Number of streams
1			
2			
3			
4			
5			
6			

	Number
b How many CLASSROOMS are there in your school (count classrooms that are used for instruction excluding laboratories and techical or vocational workshops)	
c How many laboratories are there in your school?	
d How many technical and vocational classrooms?	
e Take a typical average classroom. Estimate the size of a typical classroom in square metres (you can ask for this to be measured for a more accurate estimate)	

	Yes	No
f Does the school have enough equipment to do basic experiments (such as microscopes, weighing machines, bunsen burners etc.?)		
g Do students have to work in groups to use the basic materials to do experiments because there aren't enough for everyone?		
h Does your school have basic facilities to teach technical or vocational subjects?		

	Never	Once a week	Twice a week	Three times per week	Four times per week	Everyday
i How often are laboratories used?						
j How often are technical or vocational workshops facilities used?						

k Is your school a boarding school?	No	Yes

If school is a boarding school

	Boys	Girls
k.1 How many dormitories are there?		
k.2 How many students, on average, occupy a dormitory?		

	Local currency
k.3 How much was spent on feeding students for last term?	

l Is your school both a boarding and day school?	No	Yes

If school is a boarding and day school

	Number
l.1 How many students are boarding?	
l.2 How many attend as day students?	

m Electricity	Local currency
m.1 How much do you spend on electricity last year?	

m.2 Who provides the electricity?	

m.3 How often did you have power cuts in the school last year? Tick one box in each row	Ofen	Rarely	Never

n How much do you spend on water in a year?	Local currency

o State the number	Number
o.1 How many toilets are there in this school?	
o.2 How many toilets are in use in this school?	

If your school is mixed	Number
p.1 How many toilets are allocated for girls?	
p.2 How many toilets are allocated for boys?	

	No	Yes
o Does the school own any vehicles		

If school owns any vehicles

o.1 How many vehicles does the school own	

	Number
o.2 What type of vehicles	
o.2.1 Lorry	
o.2.2 Bus	
o.2.3 Minibus	

o.3 Approximately how old (years) are the vehicles	

	Local currency
o.4 On average how much does the school spend a year on fuel for running its vehicles	

	No	Yes
q Does the school hire any vehicles		

If school hires any vehicles

q.1 How many vehicles does the school hire	

	Number
q.2 What type of vehicles	
q.2.1 Lorry	
q.2.2 Bus	
q.2.3 Minibus	

	Local currency
q.3 On average how much does the school spend a year on hiring vehicles	

	Local currency
r On average how much does your school spend a year for maintenance of school infrastructure?	

52 The following questions refer to personal emoluments (salaries) of staff in your school before tax

	Approx. salary a month (local currency)	
	Government salary	Governor's contribution
a How much does a headteacher earn?		
b How much does the deputy headtearcher earn?		
c How much does the Graduate tearcher earn?		
d How much does a Grade V tearcher earn?		
e How much does the average unqualified teacher earn?		
f How much does the average professional support staff earn?		
g How much does the average other support staff earn?		

END OF PART V
END OF EESSA QUESTIONNAIRE