

# **An Investigation of the Relationship between School and Pupil Characteristics and Achievement at the Basic Education Level in Malawi**

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## **Abstract**

This study investigated how school, classroom and pupil factors influence pupil achievement in mathematics, English and Chichewa. Tests in the three subjects were administered to 6,000 pupils in 100 primary schools. The results indicate the follows: low achievement in English and mathematics; greater achievement in urban schools, especially in English; better pupil performance in schools with teacher pupil ratios below 50 in standard 7; better pupil performance in classes with trained teachers; and better pupil performance in classes with textbooks in any ratio than those without textbooks. At the upper level, pupils at an appropriate age performed better than overage or underage pupils; boys consistently performed better than girls, although the differences were small; a pupil's family socioeconomic status had a positive influence on achievement; and the mother's education was also positively related to performance. The study concludes that basic education with rudimentary structures requires appropriate trained teacher pupil ratios to promote cognitive growth.

## **Introduction**

In Malawi, universal primary education had been on the political agenda since the 1960s but was pursued only in small phases in the 1990s following the Jomtien (1990) recommendations. After the first democratic elections in 1994 the new government embarked on a bold but ambitious education reform and declared primary education free. Malawi thus became the first Sub Saharan African country to make this move toward Universal Primary Education. Enrollments soared from 1.2 million in 1994 to 3.0 million. This rapid increase in enrollment brought about an unprecedented stress on the existing resources in the sector. Pupil-teacher ratios, pupil-classroom ratios, pupil-text book ratios and most other educational indicators reached unacceptable levels. The quality of education was thus seen as having plummeted while increased access seemed to have been the only gain.

In 2004, a decade later gains such as a decrease in the number of untrained teachers, decreasing disparities between boys and girls, increased access and provision of text

books are noteworthy. However drop-out rates (15%), completion rates (30%), attendance rates (88%) and pass rates (30%) have remained at unacceptable levels (Ministry of Education 2005). The system seems little able to keep children in school and the children are not able to reach acceptable levels of literacy and numeracy even when they stay on in school. With efforts by various players to improve the quality of education it is imperative that these are directed in a manner which brings about positive changes and growth. This requires deep insights into how the various efforts or inputs into education sector are being integrated at the school level and how, among various variables, achievement is being affected. Characteristics of schools are dependent on various inputs to schools and take the form of all measurable factors that are brought into play at the school to influence achievement. These range from resources such as infrastructure, availability of teachers, availability of textbooks and availability of desks to personal characteristics of teachers and pupils. To study how these interact to affect achievement, first a quantitative approach was taken with the intention of following up the findings using qualitative approaches.

### **Rationale**

Free primary schooling and the eventual attainment of Universal Primary Education is a desideratum that recognizes that education is a basic right which should not be denied to any children and that it is a major strategy for empowering citizens of any country to improve their own lives. Basic education is seen as a necessary condition for development. It is an opportunity for equalizing the welfare of the individual in society and for developing countries it is one way of alleviating poverty. But when the children in school, as they are in Malawi, are failing and dropping out en masse without attaining the basic literacy and numeracy then serious questions arise as to whether the education offered is appropriate or not. Questions also arise as to whether the schools are adequately equipped to absorb pupils from diverse backgrounds. This study explores the extent to which the school environment and the children's home backgrounds are contributing to the poor performance in Malawi even when the education is free.

### **Statement of the problem**

In Malawi a politically motivated decision to introduce free primary education in 1994 resulted in increased enrollments without accompanying improvements in quality. Quality indicators such as drop out rates, teacher pupil ratios and pupil performance have since plummeted to alarming levels. The issue of quality is being addressed in a piecemeal way, in trickles and in an uncoordinated manner. There is a tendency for school development efforts to be focused on one single problem in a school where a holistic approach would bring about desired gains in performance. For example, constructing class rooms without providing latrines, furniture, black boards, chalk and teachers does little to alleviate problems in the teaching and learning processes. Most of the efforts are mere stop gap measures which address one problem while other problems still exist. Thus it is not known which school characteristics or combinations of school characteristics

and pupil characteristics have an impact on the quality of education in general and on achievement in particular in different locations in the country.

### **Research questions**

This study was guided by the following research questions:

1. What are the relationships between the school level, classroom level and pupil level factors and pupil achievement in mathematics, Chichewa and English in Std 5 and Std 7?
2. What combinations of school characteristics and pupil background are associated with pupil achievement in mathematics, Chichewa and English in Std 5 and Std 7?

### **Significance of the study**

This study is significant for several reasons. First, it provides an understanding of the relationships that exist between educational inputs at the school level, classroom level and pupil level on the one hand and achievements on the other hand. Secondly, this study is a starting point in isolating minimum levels of resources and conditions required by different school settings to influence achievement. This study again complements the efforts made so far to find effective schools in Malawi by using rigorous statistical techniques which have not been extensively used in previous studies. These are all in consonance with the national strategic objectives of EFA goals 5 and 6 which aim at creating a conducive learning environment for both boys and girls; promoting higher achievement levels especially for girls; improving the availability of teaching and learning materials; and promoting effective monitoring and evaluation of education quality.

### **Theoretical framework**

The overall framework of schooling and schooling outcomes can be posited as having supporting inputs which flow into schools where schooling conditions are set to produce what we want to recognize as school outcomes (Heneveld 1994; Heneveld & Craig 1996). Contextual factors in generating school outcomes are the political will to embark on and support a schooling system, the economic muscle to support and sustain the system, the cultural milieu and how the school system aligns itself to the global trends in education. All these help to shape the kind of outcomes we expect to see in children who pass through the system. Directly linked to schooling itself are moral, material and human resources made available to the school where a conducive climate with the right mix of conditions are manipulated in a classroom to produce desirable outcomes. But also important are the children themselves with regard to how ready they are to blend into the mix we call schooling. It is clear that the factors are connected in an intricate way since we are dealing with social issues where how one factor influences an outcome cannot be entirely independent of the many other factors in the process.

However, when basic and fundamental elements of schooling are considered it is possible to change the outcomes considerably because there is little influence from

external factors. When rudimentary schooling systems are considered most external influences become minimized and changes in the basic elements of schooling can lead to measurable changes in the outcomes.

Further the outcomes identified in Malawi at the primary level are functional literacy and numeracy. Measures of these outcomes are relatively easy and schools in Malawi employ such measures to determine effectiveness of schools. This study focused on basic school level characteristics, basic classroom level characteristics and basic pupil level characteristics to investigate their effects in influencing growth in attaining literacy and numeracy in rudimentary schools in Malawi. This study explored the effects of some basic school characteristics, inputs and pupil characteristics on achievement through a quantitative approach with a view of employing qualitative analyses as follow up studies.

## **Review of Literature**

In the industrialized world where school systems are well developed, there are so many external and internal players who influence what goes on in a classroom. There are also many different views on what constitutes school outcomes. The factors that come into play to influence school outcomes are thus connected in a complex way and it is not easy to pinpoint one particular aspect or a set of aspects of schooling which contributes to schooling outcomes. But when schools have similar conditions of resourcing, it is possible to manipulate and investigate the impact of other factors on outcomes. The overall framework provided by Heneveld (1994) and Heneveld and Craig (1996) depicts most possible sources of influence on the outcome of schooling. In different settings different sets of factors may affect schooling outcomes. Evidence from numerous research studies in the developed world from the 1980s has shown that in the right circumstances teachers and schools can become more effective in making children become more intelligent (Mortimer et al. 1988). The essence of this is that when schools in poor circumstances are properly adjusted they may become effective in enhancing schooling outcomes. Drever (1991) concludes that in Scotland for example effective schools emphasised on:

- 1 high intellectual expectation of teachers
- 2 a professional attitude towards school and staff development
- 3 the use of rewards rather than punishments
- 4 an emphasis on teacher involvement in development.

These are in agreement with what the California Center for Effective schools considers to be at least some seven attributes which improve academic excellence. These are a clear and focused mission, high expectation for success, instructional leadership, frequent monitoring of student progress, opportunity to learn and student time on task, a safe and orderly environment and a conducive home school relationship. In China, for example, Lai, Sadoulet and De Janvry (2008) found that school characteristics

mattered for test scores at the high school entrance examination and that teacher's quality significantly improved academic performance.

As can be seen these attributes are possible in well-developed education systems where contextual factors are already at optimum levels and what is required are mere adjustments. In addition the outcomes of schooling are wide and not restricted to performance in academic subjects.

Another set of studies point to student attributes as being more important in influencing student learning outcomes than school attributes. Betts, Zau and Rice (2003) showed the most economically disadvantaged students in San Diego in the USA exhibited lower scholastic achievement from the outset of their schooling and never catch up. Using test scores for 4<sup>th</sup>, 8<sup>th</sup> and 12<sup>th</sup> grade students in Massachusetts and applying an ordered logit model Jaggia and Kelly-Hawke (1994) found that family background and the stability of a community were the main factors affecting student performance. The data suggested that higher levels of spending had no consistent or systematic relation with student performance. Using data from schools in seven counties in Florida, Tschinkel (1998) showed that most of the differences in school performance were associated with characteristics of their student bodies and not with characteristics of schools. Student poverty factors were overwhelmingly stronger predictors of school performance than were any school factors.

These studies seem to indicate that there are school characteristics that can make a difference to pupil performance within the school but high performance of a relatively affluent school must be largely attributed to the influence of students' families. Studies in different regions of Africa are not very conclusive in terms of school factors and pupil factors but tend to acknowledge the importance of both. This study takes inspiration from studies that looked at effective schools in poor countries which are still grappling with providing resources to schools and whose communities are mostly illiterate and have little conceptualisation of what constitutes schooling. Furthermore the systems also focus on functional literacy and numeracy although other outcomes are mentioned. These outcomes are easy to measure unlike in the developed systems.

In Uganda a baseline study showed that the best and worst performing schools had very little or no instructional materials including text books, teachers guides and charts. There was no correlation between examination results at the end of primary schooling to instructional materials. However a test of writing ability positively correlated with instructional materials. This means that in the case of literacy and numeracy it was likely that instructional materials had a significant part to play (Carasco et al. 1996). In the same country a study conducted in a poor region where the population had been visited by many adverse elements such as drought, civil strife and continued insecurity, Oluka and Opolot-Okulut (2008) found that performance of students was adversely affected compared to other regions mainly attributed to teacher factors, large classes, poor school facilities, lack of home work, lack of a reading culture among teachers and pupils, lack of sound leadership in the school administration and inadequate amount of time allocated to

teaching and learning.

In Madagascar several studies revealed that leadership skills of a school principal, the degree of community participation were the major influence on pupils' educational achievement. Teaching materials used and teachers' skills and attitudes together with schools' facilities and equipment were found to be important albeit secondary to the first two (Ramandriafamatanantsosa 1995). In this system, the presence of materials and teachers demand principals' management skills to maximise outcomes. These studies showed that with proper methodologies some factors in a multilevel model such as a school can be isolated to see the impact on performance. In Botswana, Mwamwenda and Mwamwenda (1987) linked the availability of classrooms, desks and books to significantly better performance in examinations. This was in support to the contention that school facilities are integral to academic achievement. Similarly a study in secondary schools in 1987 by Vulliamy (Pennyquick 1997) found that school facilities did seem to be related to achievement. These studies exonerate the intentions of this study to see how much some of the school facilities in Malawi and in South West Education Division specifically do influence performance in resource poor and rudimentary school systems. Pennyquick (1997) summarised research evidence from developing countries and emphasised that more evidence is needed to strengthen the case that school facilities and pupil home characteristics influence pupil achievement or performance in class. In contrast, using multilevel modeling techniques Kadzamira (1982), found that prior achievement, age and social background were the factors that affected performance in secondary schools in Malawi. This result seems to be in agreement with those conducted in the USA and mentioned above which link performance to student background.

All these studies ignited interest in the Malawi context given a paucity of research in this area and that as the country witnesses a multitude of interventions by development partners through Non-Governmental Organisations in the form of classrooms, desks, textbooks, toilets, exercise books, black boards and other basic requirements there is need to isolate those factors that really matter. The claim is that these interventions/inputs will help improve the quality of basic education. Several initiatives have been undertaken to measure the levels of literacy and numeracy of pupils at different levels both in primary schools and in secondary schools. SACMEQ studies in 2001 and 2004, (Milner et al. 2001; Chimombo et al. 2004) investigated pupil, teacher and school factors and how they related to the achievement of minimum levels of literacy and as politics, culture, economic prosperity and global trends set the standards. The main findings were that the majority of the pupils in Malawi primary schools were performing below minimum and desirable levels of reading and mathematical skills.

When compared to pupils at similar levels in the Southern African Region, pupils' achievement in Malawi has always been at the bottom of the list. A similar study by MIE (2005) in 12 districts showed that learner achievement in four subjects at the primary school level was below expected levels and that less than 10% of the learners were adequately prepared for the next higher class they were to move into. NIPDEP (2003)

showed that there were slight increases in performance in mathematics and English after JICA introduced some interventions such as infrastructure, teacher in – service and teacher support in schools. However the achievement levels remained disturbingly low. The same study showed that class teachers had problems getting right all tasks set for the pupils. PLAN (2005) also report of some increases in the percentages of pupils gaining mastery in Chichewa after teachers in two districts had undergone some specific training. These studies give credence to the view that it is possible to improve pupil achievement through targeted interventions.

What is deficient in these studies is that they fall short of identifying what factors and how much each of the interventions is influencing the changes. This study intended to isolate pupil, classroom and school factors and determine the extent to which these factors influence achievement in primary schools in Malawi. Such an analysis goes a long way in helping to prioritize school inputs in the quest for improved quality of education. It also helps to identify what home factors are crucial in helping children to achieve acceptable levels of learning in Malawi.

## **Method**

### **Sampling**

To compare rural schools and urban schools, the South Western Division was selected out of five other Divisions because it had the largest proportion of urban schools. In this Division, there were 544 rural schools and 70 urban schools in 2005 giving a ratio of 8:1.

A hundred schools were randomly selected to reflect the population of rural schools and urban schools which were in the ratio of 8:1, approximating a sample of 88 rural schools to 12 urban schools. The schools were further selected to fit low teacher pupil ratios; medium teacher pupil ratios and high teacher-pupil ratios. High teacher-pupil ratios were those in the range 1:71 and above. Medium teacher-pupil ratios were taken to be those in the range 1:50 to 1:70 and low pupil teacher ratios were from 1:50 and below.

Achievement tests in English, Chichewa and Mathematics were administered in standard (Std) 5 and standard (Std) 7 to random samples of 30 pupils per standard per school giving 60 pupils per school. Altogether there were 6,000 pupils taking three tests each. The socio-economic status of these pupils was also captured.

### **Instruments**

The data which were collected were teacher and pupil bio data, school characteristics and pupils' achievement. Three types of instruments were used to collect this data:

#### ***-Pupil socio-economic background***

The instrument captured the standard, the name, sex and age of a pupil. The socio-economic back ground for the pupils (SEB) included parents' education, availability of

books, radio and bicycle or other forms of transport, type of housing and availability of clean drinking water.

### ***-School profile***

The school profile captured enrollments by class and by sex, numbers of teachers and teachers' qualifications, numbers of classrooms, desks, toilets, textbooks and additional inputs such as infrastructure and teaching and learning resources.

### ***-School achievement tests***

A selected group of teachers involved in the moderation and marking of the Malawi Primary School Leaving Certificate Examinations under the auspices of the Malawi Examination Board, Primary Education Advisors and researchers were given the task of constructing achievement tests. Achievement of pupils who had 5 and 7 years of schooling was measured through multiple-choice tests in English, Chichewa and mathematics. These subjects were chosen because they offer a direct opportunity to determine reading and mathematical competencies without confusing the understanding of concepts in various subjects. The study used Std 5 and Std 7 pupils because the Std 5 pupils had shown some measure of perseverance where most pupils drop out and that they were about to enter senior classes where they would be required to engage in work which relies on a sound foundation in literacy and numeracy. Standard 7 was selected because this represents part of the final phase of the primary school cycle and it is important to know what skills the graduates were equipped with as they move on with life.

### **Procedure**

A pilot study was first carried out in five schools in five districts in the South West Educational Division. The idea was to get feedback on the appropriateness of the instruments and the reliability of the tests.

A team of five researchers selected 20 schools from each district of Chikwawa, Nsanje and Mwanza while 28 schools were selected from Blantyre Rural and 12 were selected from Blantyre Urban. The schools were selected based on whether they were either in a rural or an urban location and whether they had low, medium or high teacher-pupil ratios. Low teacher pupil ratio was where teacher-pupil ratio ranged from 1:49 to 1:20. Medium teacher-pupil ratio was taken as 1:50 to 1:70. High teacher-pupil ratio was taken as ranging from 1:71 to 1:300. All together there were 100 schools.

The team selected five teachers to work as research assistants or invigilators during the administration of tests and questionnaires. The team explained the purpose of the research and trained them how to administer tests and questionnaires. Five teams were formed each consisting of one researcher and one assistant. The team discussed the logistics. It was then planned that each team would visit one district and administer tests to 20 schools in the district. Each team was to visit two schools on each day and this was to take 10 days to complete the task.



At each school the researchers used Std 5 and Std 7 class registers to randomly selected 30 pupils who were to take the tests and respond to questionnaires. The head teacher was also asked to arrange rooms where the tests were to be taken. The pupil's profile questionnaire was administered before the beginning of the tests. The head teacher was asked to fill the school profile questionnaire.

## **Findings**

This section presents the findings of the study where quantitative data was used to find out what factors seemed to influence performance in primary schools in Malawi. Three clusters or levels of data were analyzed. The levels were school level, classroom level and pupil level. At each level, different variables that were well defined in the data collection were treated in the analysis to see if there were any indications that they contributed substantially to pupil achievement in English, Mathematics and Chichewa in Std 7 and Std 5.

The results below are from separate step-wise regression analyses of the variables at the three levels based on the Beta weight using the SPSS statistical package. The Beta values determine which of the two or more independent variables is the more important in relation to the dependent variable. It gives how much the standard deviation on achievement is produced by a change of one standard deviation on the school level, classroom level and pupil level factors. In this way it was possible to make predictions as to which variables or factors at the three levels were likely to influence achievement in the three subjects at grade 5 and 7 levels. The sign of the Beta depended on the values of the codes assigned to each variable. To verify the degree of influence of the factors on the performance, actual means were calculated for each factor at each level.

School level variables that were easy to collect in the space of time of the data collection process were school location, school owner and school teacher to pupil ratio. School location was categorized as urban and rural schools. School owner was categorized as government and grant aided schools while school teacher to pupil ratio was categorized as schools with teacher to pupil ratio below 50, those above 50 but below 70 and those with teacher to pupil ratio above 70. At the classroom level the study analyzed the effects of classroom teacher to pupil ratio and textbook to pupil ratio on performance of pupils in English, Mathematics and Chichewa.

Finally, at the pupil level, the study analyzed the effects of sex, age, mother's education, father's education and socio-economic status as indicated by sources of water, type of toilet and source of lighting, ownership of television, motorbike and oxcart on achievement in English, Mathematics and Chichewa. These are considered as indicative of relatively high socio-economic status in Malawi.

## **Achievement levels**

Maximum scores, minimum scores, mean scores and standard deviations on the

scores were calculated to describe achievement levels of the pupils in the three subjects. Table 1 shows the statistics in English, Mathematics and Chichewa. The performance in Std 5 was just above average in English and above average in Chichewa but below average in Mathematics. In Std 7 the performance was below average in English and mathematics and was just average in Chichewa. The results show that achievement levels are very low in Std 7 compared to those in Std 5 meaning that as pupils finish their primary schooling they have low achievement levels.

**Table 1. Mean Scores in English, Mathematics and Chichewa**

Subject	Number	Std 5			Std 7		
		Possible score	Mean score	Standard deviation	Possible score	Mean score	Standard deviation
English	2549	30	16.44	6.318	40	15.74	6.148
Mathematics	2527	30	13.92	4.553	40	12.10	6.150
Chichewa	2498	30	22.18	4.701	40	20.40	5.021

### School level factors

School level factors that were considered were school owner who could be government or religious organization, school location which could be rural or urban and school teacher pupil ratios. Stepwise regression analyses of the school level factors on each subject were carried out. The B values determine which of the independent variables were the more important in relation to the dependent variable. Means were calculated for each factor to further verify whether the influence was positive or negative.

Table 2 shows that school location produced more variability in English and mathematics in Std 7 while trained teacher pupil ratio also showed appreciable variability in English in both classes and also in Chichewa in Std 7. School owner showed little variability in all subjects and in both classes.

This means that the location of a school had a lot of influence on achievement in English and mathematics especially in the upper standard. Similarly trained teacher pupil ratios affected achievement in English and Chichewa in the upper standard. The only influence in Std 5 was trained teacher pupil ratio. School owner showed little influence on achievement in all the three subjects and in both standards meaning that pupil achievement was little influenced by who owned a school.

**Table 2. Influence of School Level Factors on Achievement in English, Mathematics and Chichewa**

Explanatory Variable	English <i>B</i>		Mathematics <i>B</i>		Chichewa <i>B</i>	
	Std 7	Std 5	Std 7	Std 5	Std 7	Std 5
School location	-0.249	-0.047	-0.192	-0.013	-0.098	-0.009
School owner	-0.061	-0.016	-0.027	-0.031	-.0055	-0.007
Trained teacher/pupil	-0.196	-0.156	-0.098	-0.077	-0.107	-0.096

### Classroom level factors

Classroom level factors which were analysed were classroom teacher-pupil ratio and textbook-pupil ratios. These were the dependent variables which could easily and consistently be collected in the schools and therefore are well defined for purposes of analysis and comparison. Regression analyses were carried out to show how much each factor contributed to performance while for each factor means were calculated to give a clear picture of the differences in the elements of the factor.

Step-wise regression analyses were carried out to see how much trained teacher-pupil ratios, untrained teacher-pupil ratios and textbook-pupil ratios influenced achievement in the three subjects in the two standards. Table 3 below shows Betas for the three factors.

The results in Table 3 above indicate that Chichewa textbook to pupil ratio in Std 7 showed appreciable influence on achievement and teacher pupil ratio had some influence on performance in English in Std 5. The other classroom factors have low Betas indicating that their influences on performance in the other subjects were not very varied and therefore had little influence on achievement in English and mathematics. With the low achievement levels in mathematics and English especially in the upper standard it is difficult to separate out the effects of the classroom factors on achievement. More explanations of why this was the case is likely to be found through investigations of various classroom practices.

**Table 3. Beta for Classroom Level Factors on Achievement in Std 7 and Std 5**

Explanatory Variable	English <i>B</i>		Mathematics <i>B</i>		Chichewa <i>B</i>	
	Std 7	Std 5	Std 7	Std 5	Std 7	Std 5
Trained T/ pupil ratio	-0.016	-0.103	-0.023	-0.034	-0.041	-0.047
Untrained T/ pupil ratio	-0.056	-0.005	-0.047	-0.131	-0.057	-0.041
Text book/ pupil	-0.026	-0.070	-0.069	-0.050	-0.106	-0.0038

### Pupil level factors

This section highlights the findings on each of the pupil level factors on achievement of pupils in both standard 7 and 5. Step-wise regression analyses of the pupil level factors were conducted and the results were verified by the mean scores for each type of factor.

The official entry age for primary school is 6 years and it is expected that normal age for Std 7 pupils should be between 11 and 13 years while for Std 5 pupils should be between 9 and 11 years. Table 4 below shows Betas for pupil characteristics and family socio-economic background indicated by ownership of some household goods.

The Betas in Table 4 above show that age of a pupil was consistently connected with achievement especially in Std 7 in all the three subjects and in English for Std 5. A cross check at the actual means shows that pupils who were underage or over-age were the more likely to do less well in the three subjects than pupils who were at the recommended ages. Sex of a pupil was also connected to achievement in the three subjects in Std 7. Boys

were also more likely to do better than girls in the three subjects in Std 7. Availability of facilities associated with higher social status also played appreciable roles in affecting achievement for the upper standard especially in English. In the case of Std 5 the greatest influence came from age of a pupil especially in English. The other factors played insignificant roles in influencing achievement as their Betas were mostly small.

**Table 4. Betas for Age, Sex and Socio-Economic Background**

Explanatory Variable	English <i>B</i>		Mathematics <i>B</i>		Chichewa <i>B</i>	
	Std 7	Std 5	Std 7	Std 5	Std 7	Std 5
Age	-0.177	-0.116	-0.194	-0.014	-0.144	-0.064
Sex	-0.146	-0.071	-0.120	-0.079	-0.100	-0.041
Television	-0.350	-	-	-	-	-
Motorcycle	-0.167	-	-	-	-	-
Water source	-0.079	-	-0.099	0.016	-0.087	-0.007
Type of toilet	-0.074	-0.083	-0.041	0.041	-0.074	-0.071
Lighting	0.050	-0.085	0.039	0.065	-0.018	-0.115
Have Oxcart	0.131	-	-	-	-	-
Have a Bible	-0.084	-	-	-	-	-
Father's education	-	-	-	-	0.015	-0.017
Mother's education	-	-	-	-	-0.017	-0.017

## Conclusions

The study of factors which influence achievement is complex as it deals with numerous variables which change their effects depending on other existing variables. This study addresses the issues of quality in basic education. Malawi is a striking case of where inequity in the distribution of school teaching and learning materials as well as in the distribution of teachers is large. Rural schools are the least endowed with school facilities compared to urban schools. Life in rural areas revolves around agrarian activities while urban life is a maze of high material quality life in terms of nutrition, physical wealth and cognitive stimulation. The demand for labour or opportunity costs is higher in rural areas where children are required to work to supplement family income for a good part of the day. Pupils in affluent families start school early while those from less affluent families have less pressure and less motivation to start school at an early age. Girls in rural areas are more likely to get the brunt of all the inequities as motivation for sending them to school is less than for boys (Chimombo et al. 2000; Fuller 1986). All these and other socio-economic variances are likely to affect how pupils perform in school. From the analysis in the preceding sections, the study has gained insights into which of these experiences seem likely to have an effect on performance. It is also the case that experiences in schools are cumulative in nature and it can be expected that more visible responses are to be registered at upper levels of basic education than at lower levels. This chapter presents the interpretation of the results from the analysis. Some explanations of the results are offered but methodological limitations may explain the results where nothing seems to make sense. The conclusions are outlined by factors at school level,

classroom level and pupil level and an overview of the factors that seemed to have made a difference in achievement is given.

### **School level factors**

School level factors considered in the study were location of a school categorised as urban and rural, owner of the school categorised as government owned and grant aided school and trained teacher pupil ratio of a school categorised as schools with teacher pupil ratios below 50, schools with teacher - pupil ratios between 50 and 70 and schools with teacher pupil ratios above 70.

In Std 7 the location of a school consistently showed more variation in performance in all the subjects followed by trained teacher pupil ratios. These results show that as far as the upper levels of basic education is concerned there were more opportunities for pupils in urban areas to perform better in all the three subjects than in rural schools. This seems to be a strong pointer as to which schools children are likely to finish basic education with higher scores which are measures of literacy and numeracy. Also convincing were the variations of achievement in schools with different teacher pupil ratios. Schools with teacher pupil ratios below 50 consistently performed better than schools with higher teacher pupil ratios in mathematics and in English but not in Chichewa. Chichewa is a local language which is spoken by all pupils and therefore requires distinctive or subtle strategies and experiences to affect noticeable variability in performance. Therefore, according to these results it appears that performance in the upper levels of basic education was likely to depend on where the school was located and on favourable teacher – pupil ratios especially in the case of English and Mathematics.

The study found no differences in performance between government owned schools and grant aided schools. It is the case that inputs to both types of schools are not different as government provides materials and teachers to schools depending on school needs and there is no prioritising according to owner. The District Education Manager distributes resources to schools without considering whether a school is government owned or granted aided. Therefore this study echoes the need to equitably provide resources to both urban and rural schools as the latter seemed to be disadvantaged especially for the sake of high achievement in literacy and numeracy.

For the lower standards represented by Std 5 only school teacher pupil ratios seemed to exert influence in achievement in English but not much in Chichewa and Mathematics. School location and school owner seemed to play insignificant roles in impacting on achievement. It appears then that teacher pupil ratios were the most common influential factors at the school level in relation to achievement.

### **Classroom level factors**

Classroom level factors which were investigated in this study were trained teacher pupil ratios and textbook pupil ratios. In this case teacher pupil ratios were at classroom level not whole school teacher–pupil ratios. Textbook-pupil ratios which were considered

were from 1:1 to 1:3, above 1:3 and where there were no textbooks. In Std 7 and Std 5 different levels of trained teacher pupil ratios did not yield consistent results in achievement in all the subjects. This can be partly explained by the low achievement levels with small standard deviations which make it difficult to separate out what factors really made difference in the achievement. It could also be explained by the practice in many schools where a number of teachers float from one standard to another specialising in one or two subjects. In many cases, no single teacher is assigned to one particular standard/class but float from one class to another and this may have confounded our results because the study was not measuring the effect of one particular teacher but several of them. It was thus difficult to isolate effects of different teachers on different subject.

Similarly in the case of textbook-pupil ratios the differences between classes with low and high ratios were slight though those with low ratios tended to perform better in English and Chichewa but this was not the case with Mathematics. However classrooms where there were no textbooks performed much poorer than classes with textbooks in whatever ratio to pupils.

Therefore the presence of a trained teacher in a classroom appeared to have some little influence in achievement in all subjects at all levels of basic education but it is not very conclusive as to which teacher-pupil ratio the teachers functioned optimally. Similarly classes with some textbooks appeared to have made a difference compared to classes without textbooks. These results underline the need to have trained teachers in classrooms and the need to ensure that textbooks are made available to pupils. To isolate effects of levels of resourcing at the classroom level further, classroom observation might reveal what goes on between trained teachers and pupils to influence achievement. This would also give opportunity to observe textbook usage as this might explain the small variations in effects on achievement. Such an investigation would give insights into classroom experiences and interactions between teachers, teaching and learning materials and pupils. It would show whether teachers give home work or whether pupils take textbooks home and other related activities which assist pupils to grow cognitively.

### **Pupil level factors**

At the pupil level the study analysed the effects of age, sex, mother's-education and socio-economic status. At the upper basic education level age and sex of a pupil appeared to matter considerably in all the subjects. Pupils at an appropriate age performed consistently much better than those who were underage or overage. Boys consistently performed better than girls. These results have implications on the enforcement of appropriate ages as well as the teaching strategies organised for girls. If the system still allows children to enter school at advanced ages the levels of performance cannot be expected to improve. It appears the cognitive growth of over-age pupils does not match the cognitive demands of a school curriculum.

The socio-economic status of a family has been shown to have a significant influence on performance. This is in line with earlier findings by (Kadzamira 2001). What

seems to be the case is that wealthier families are able to provide for school needs of their children and this puts the children in a better position to participate in classroom work than those from poorer families.

Another interesting result though not prominent in the regression was that education of the mother especially if it is beyond basic education tended to positively influence pupil achievement in the upper levels. Pupils whose parents had an education beyond basic education stood a better chance of being influenced by the parents to do well in school.

However it seems that pupils in the early years of basic education as represented by Std 5 did not gain comparative advantage of education of parents although there were some indications that this could be true. It is possible that some children especially in Std 5 did not know the exact education level of their parents and hence the hazy evidence in the results. It was also apparent that for lower levels of education it is not easy to isolate factors that come into play as age, sex and type of housing interchangeably became prominent in their relationship with achievement in the different subjects.

In conclusion, the study confirmed that urban schools and rural schools have different effects on enhancing achievement especially in the upper levels of basic education. Also prominent in affecting achievement was schools' teacher pupil ratios. Urban schools seemed to have some advantages over rural schools and compounding this advantage was that schools with low teacher pupil ratios tended to perform better than those with higher teacher-pupil ratios. There was also conclusive evidence that government owned and grant aided schools performed equally well or equally badly.

At the classroom level it was not clear what levels of resourcing in terms of teacher-pupil ratio and textbook-pupil ratios produced better achievement. But it is clear that the availability of trained teachers and textbooks do make a difference in schools.

At the pupil level age and sex and even socio-economic background were responsible for differences in pupil performance. Pupils at the right age consistently performed better than pupils at other ages and boys consistently performed better than girls albeit with slight differences. Wealthier families seemed to influence achievement of their children in school than poorer families. A lot can be said about providing for the needs of children and encouraging them to go to school when parents can afford to do so. However, absenteeism, ill health, malnutrition, hunger and other elements of children from poor families may be militating against their growth and achievement in school.

And finally parent's education, if it is above basic education gave slight indications that it affected performance especially in the upper levels of basic education. In some cases factors affecting children's schooling and background may not have been well defined and hence it was not easy to draw binding conclusions.

## References

- Association for Effective Schools Inc. (1996). Correlates of effective schools. [<http://www.mes.org/correlates.html>]
- Betts, J., Zau, A. & Rice, L. (2003). Determinants of Student Achievement: New Evidence from San Diego. [<http://www.ppic.org>]
- Byrk, A. & Raudenbush, S. (1989). Towards a more appropriate conceptualization of research on school effects: A three level hierarchical linear model. *Multilevel Analysis of Education Data*. In R. D. Bock (Ed.) *Multilevel analysis of educational Data*, San Diego, Academic Press.
- California Center for Effective Schools (undated ). [<http://www.mes.org/correlates.html>]
- Carasco, J.; Munene, J., Kasente, D. & Odada, M. (1996). *Factors influencing effectiveness in primary schools in Uganda: A baseline study*. Bonn: DSE.
- Chimombo, J., Chibwana, M., Kadzamira, E., Kunkwezu, E., Kunje, D. & Nampota, D. (2000). Classroom, school and home factors that negatively affect girls' education in Malawi. UNICEF.
- Chimombo, J., Kunje, D., Chimuzu, T. & Mchikoma, C. (2004). The SACMEQ II project in Malawi: A study of the conditions of schooling and the quality of education. SACMEQ policy research report, IIEP.
- Drever, E. (1991). School effectiveness: Criteria and evidence. A discussion paper. [<http://www.scre.ac.uk/spotlight/spotlight31.html>]
- Heneveld, W. (1994). Planning and monitoring the quality of primary education in Sub-Saharan Africa. World Bank AFTHR Technical Note No.14.
- Fuller, B. (1986). Raising School quality in Developing Countries: What investments Boost learning? World Bank discussion papers.
- Heneveld, W. & Craig, H. (1995). Schools count, World Bank Technical paper No. 303.
- Jaggai, S. & Kell-Hawke, A. (1994). An Analysis of the factors that influence student performance: A fresh approach to an old debate. Paper presented at the Western Economic Association International 69 annual conference in Vancouver, B.C, July 2.
- Kadzamira, E. (2001). Research on school effects on students' achievement in developing countries with special reference to Malawi: Methodological issues. *Zimbabwe Journal of Educational Research*, 2(13), p.109-141
- Lai, F., Sadoulet, E. & de Janvry, A. (2007). Do school characteristics and teacher quality affect student performance? Evidence from a natural experiment in Beijing middle schools. A manuscript.
- Lockheed, M. & Bruns, B. (1990). School effects on achievement in secondary mathematics and Portuguese in Brazil. World Bank Working Paper.
- Maganga, J. (2005). JICA/NIPDEP Survey: A comparison between baseline and mid point pupil performance. Malawi Institute of Education.
- Malawi Institute of Education (2005). National implementation program for district education



- plans in the Republic of Malawi: Tests results.
- Ministry of Education (2005). Education Statistics, EMIS, MoE.
- Ministry of Education (2006). Education Statistics, EMIS, MoE.
- Ministry of Education & UNICEF (2004). Monitoring learning achievement in lower primary standard 4. Author.
- Milner, G., Chimombo, J., Banda, T., & Mchikoma, C. (2001). The quality of education: some policy suggestions based on a survey of schools in Malawi. SACMEC Policy Research. Paris: IIEP
- Mortimore, P., Sammons, P., Stoll, L., Lewis, D. & Ecob, R. (1998). *School Matters: The Junior Years*. London: Open Books
- NIPDEP (2003). National implementation programme for district education plans. KRI International Corp.
- Oluka, S. & Opolot-Okurut, C. (2008). Performance in Primary Education in the Teso region: An Exploratory Study. Nairobi: UNESCO.
- Pennyquick, D. (1993). School effectiveness in developing countries: a summary of the research evidence. Serial No. 1 DFID.
- PLAN (2005). PLAN-Malawi schools implementation programme: End of term evaluation.
- Ramandriafamatanantsoa, J. (1995). Improving the quality of primary and secondary education in Madagascar. Association for the Development of African Education, 3(7), pp.4-5.
- Tschikel, W. R. (1998). A missing piece in the debate on school performance. [<http://bio.fsu.edu/school-performance/Miami-Herald.html>]
- World Bank (2004). Cost, Financing and school Effectiveness in Malawi: Country Status Report. The World Bank.