

# Academic Achievement Of Ugandan Sixth Grade Students: Influence Of Parents' Education Levels

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## ABSTRACT

*The study investigates the influence of a father and mother's education on the academic achievement of their child. The investigation is based on data sourced from the 2009 Southern African Consortium for Monitoring Education Quality survey comprising 5,148 records of sixth grade students enrolled in Ugandan primary schools. Students' percentage scores in the health sciences, reading, and numeracy tests were adopted as a measure of academic achievement. The analysis was carried out using summary statistics and a multiple linear regression clustered by six geographical regions in Uganda: central, eastern, western, northern, southwestern, and northeastern. In addition to father and mothers' education, students' test scores in the various disciplines were analyzed by the characteristics of age, sex, rural-urban residence, grade repetition status (any grade), and length of pre-primary education. The results showed that the level of a father's education required to predict whether the child will achieve better scores in all disciplines was primary education. However, a mother required secondary and post-secondary education to enable the child to obtain better scores in reading and numeracy, respectively. Much of the previous literature has suggested that children born to educated parents have higher academic achievement; the results of this study support this finding but also reveal a difference in the levels of a father and mother's education required to predict their child's achievement of better scores in formal education.*

**Keywords:** Academic Achievement of Ugandan Sixth Grade Students; Academic Achievement of Students and Parents' Education

## INTRODUCTION

Improving student academic achievement at all levels of education is one of the primary concerns of every teacher. To accomplish this aim, teachers often make use of different teaching strategies and techniques to maximize their students' performance. In an extensive review of the literature, Mahlo and Taole (2011) suggest the following strategies to improve student performance: (i) effective management and leadership (Kurian, 2008); (ii) support programs for both students and faculty (SIAS, 2008); (iii) behavioral modification with an emphasis on discipline in public schools especially (e.g., Mestry, Moloi, & Mahomed, 2007; Moloi & Mahomed, 2007; Squelch, 2001); (iv) an integrated life skills program comprising disciplined work habits, a caring attitude, and the ability to cope as well as to create ones' own opportunities (Rooth, 2000); and (v) family and/or parental involvement (Mestry et al., 2007; Kurian, 2008), and capacity building for teacher support (De Clercq, 2008; Clarke, 2001).

In light of these five strategies for improving student performance, it is evident that students' academic success does not depend solely on their mental and physical abilities; rather, other external factors also contribute to academic excellence. To put the aforementioned strategies in perspective, Hijazi and Naqui (2006) identify three types of factors regarded as influencing student academic achievement: environmental, socioeconomic, and

psychological factors. One important aspect of socioeconomic factors is parental education (e.g., Ferguson & Ladd 1996; Mestry et al., 2007; Kurian, 2008). The consensus among researchers is that student academic achievement depends largely on parents' involvement in matters related to the education of their children. Kurian (2008) affirms that parents' active participation is not only essential to improving discipline in schools, but also promotes student academic achievement, as demonstrated by good grades. The findings reveal that children of educated parents have a higher level of life satisfaction and fewer problems (Sudhir & Lalhirimi, 1989) and are relatively more confident, self-reliant, and free from anxieties and other psychological problems (Jehangir, Tahir, & Saeed, 2000). However, these behavior traits may vary by school and the level of teachers' involvement in molding and polishing a child's personality.

Nevertheless, for parents to effectively become involved in their children's learning and thereby exert a positive influence on the children's academic performance, they must have had previous experience with the formal education system. The situation may vary by parent; for example, mothers with higher education can provide more support to their children in problem-solving situations at the preschool level. Englund, Luckner, Whaley, and Egeland (2004) reveal that "children can be encouraged to develop higher expectations of educational attainment during the early years of their education. The educated mothers are also more involved in their children's studies and helped them as compared to mothers with no or less education." The study suggests high academic achievement at later stages of schooling among children with early involvement by educated mothers. Parents maintain their interest and concern in their children's studies in higher-level classes as well (Perveen & Alam, 2008). While the situation may not be any different with regard to fathers' education level (Houtenville & Conway, 2007; Desforges & Abouchaar, 2003), Marks (2007) suggests that the impact of the mother's level of education is greater than the father's on overall academic performance of their children. This is probably because the men in most cases fulfill all of the economic needs of the family, while the women act as housewives and perform home duties such as cooking, washing, and looking after their children. However, this may not be entirely the case in Uganda, as the majority (66%) of the working population is engaged in the agricultural sector (UBOS, 2012), which employs both men and women. Though the population of Uganda includes more females than males, the proportion of women in formal employment is lower than that of males. Thus, children spend most of their time with mothers. The mother in most cases ensures that the children learn the social and moral etiquettes as well as receive religious education. In light of the fact that a majority (70.5%) of households in Uganda are male-headed (UBOS, 2012), most important decisions in a home are certainly made by the man—women are not actively involved in the decision-making process regarding household assets, cash, or income flows, or when and how often to have children. As a result, their role in choosing a school for their child is limited. The country is marked by a gender gap in control over resources and decision-making power, to the detriment of women.

Though literacy rates and levels vary internationally, in developing countries, these rates are typically estimated as lower for women compared to men. In Uganda, the estimated literacy rate is 79% and 66% for males and females, respectively (UBOS, 2012). Further, the 2006 UDHS reports higher enrollment of males than females at all levels of education (UBOS, 2006). However, much lower enrollments are recorded at secondary levels compared to primary levels of education, implying that primary education is an exit point for many individuals in Uganda. The situation with regard to male-female and primary-secondary differentials in enrollment is not different from the results obtained from analysis in the preceding demographic health surveys. Overall, males have a clear advantage over women in access to and control over resources while cultural practices bestow men with more power than women. On the other hand, the literacy levels in the country are reported to vary by rural-urban residence and geographical location; lower rates are reported in rural areas. The Northern (64%) and Eastern (68%) regions record the lowest estimates in the country (UBOS, 2012). On the other hand, given that literacy in Uganda is defined as the "ability to read with understanding and write meaningfully in any language," not necessarily English, which is the official language used in schools, the suggested association between parents' education and the academic achievement of their child may not hold. Nonetheless, the minimum levels of father and mother's education required to predict better academic achievement of their child may not be the same across countries and academic disciplines. This may be due to variations in student background characteristics and the quality of education services in different countries. Thus, the link between father and mother's education levels and the academic achievement of their child remains to be investigated in the context of Uganda.

Though a recent study in Uganda yielded similar results with regard to parents' education and student academic achievement (MoES, 2009), no statistical assessment is provided to support the conclusions made. The focus of studies in Uganda is on student academic achievement in primary and secondary education (UNEB, 2011), with hardly any linkages made to the education levels of the father and mother. Nevertheless, these studies do not control for the influence of other variables in the analysis of academic achievement. On the other hand, it is debatable whether the impact of parents' education on the academic achievement of their children holds across various discipline areas, for example, reading, numeracy, and health sciences, to mention but a few. This study therefore investigates the effect of the father and mother's levels of education on the academic achievement of their child in Uganda. The investigations are made across various disciplines to ascertain whether differentials exist in student academic achievement by their father and mothers' education. The analysis accounts for variations in the selected background characteristics of the learners.

## **DATA AND METHODS**

The investigations were based on data sourced from the 2009 Southern African Consortium for Monitoring Education Quality (SACMEQ) survey conducted in Uganda, Tanzania, and Malawi. Students were the unit of analysis. A sample of 5,148 sixth grade students enrolled in 163 randomly selected primary schools in Uganda was obtained based on the International Association for the Evaluation of Educational (IAEE) standards. The estimates of student population parameters had a sampling accuracy equivalent to a simple random sample of 400 students. The selection guarantees a 95% confidence limit for sample means of plus or minus one-tenth of a student standard deviation unit. However, small schools (i.e., those with fewer than either 15 or 20 sixth grade students) were excluded from the study due to their low representation in the total student population. In addition, these schools were mostly located in isolated areas and were thus associated with high costs of data collection. With regard to sampling design, an explicit and implicit stratification of student was performed by region and school size as measured by the number of sixth grade students. Probability proportional to size (PPS) was adopted to obtain the number of schools in each stratum: region and school size. In each of the selected schools, a simple random sample of sixth grade students was gathered using the attendance registers of students who regularly attended classes.

Data collection was carried out using a pre-designed questionnaire, test data for individual students, and a "tracking form" for the purposes of data cleaning. The test construction was undertaken carefully to ensure that the structure of student tests in reading, health science, and numeracy was congruent with the content (domains) and behaviors (skills) derived from detailed analyses of the curricula, syllabi, exams, and textbooks used in the country. The tests for the students included "overlapping" test items selected from five earlier studies: the Zimbabwe Indicators of the Quality of Education Study (Ross, 1995), SACMEQ I and SACMEQ II Projects, IEA's Third International Mathematics and Science Study (Mullis et al., 2001), and IEA's International Study of Reading Literacy (Elley, 1992). The scoring on reading, health science, and numeracy tests was based on the Rasch technique: international mean of 500 with a standard deviation of 100. However, percentages scores (100%) in the various disciplines were adopted as the measure of student academic achievement in the analysis.

The analysis was performed in two stages. First, a descriptive summary of student characteristics and academic achievement was presented using frequency distributions and summary statistics. Second, the influence of parents' education (mother and father) on student academic achievement in the various disciplines was investigated at the multivariate assessment using a multiple linear regression (MLR) clustered by the geographical location of the school: central, eastern, western, northern, southwestern, and northeastern. The analysis was modeled by a series of student characteristics comprising age, sex, prior schooling (years of pre-primary education), rural-urban residence, and grade (any) repetition status. With regard to factor interactions, the analysis was restricted to interactions between mother and fathers' education; only significant interaction terms were presented in the analysis ( $p < 0.05$ ).

## **RESULTS**

The study participants were sixth grade students in selected schools of Uganda. They are characterized as follows. There was a similar proportion of males and females, and the median age was 16 years (range: 12–27); Slightly more than half (52.6%) of the participants did not attend pre-primary school; 23.4% attend for about a year, while the rest spent more than a year in pre-primary school. With regard to the status of having repeated a grade,

slightly more than four in every nine (46.8%) had never repeated a grade, while the rest had repeated either once (35.8%) or twice (17.4%). The analysis in the subsequent section is clustered by the geographical location of schools, referred to as the region in this study. The highest proportion of students were enrolled in the eastern region (26.9%), followed by the central region (24.3%), northern region (21.1%), and western region (12.8%). The rest of the students were from the northeastern (6.1%) and southwestern (8.8%) regions.

### Student Academic Achievement

Table 1 presents a descriptive summary of the students' academic achievement in health science, numeracy, and reading. The summary statistics of student scores in the various disciplines are expressed in percentages in the analysis; a summary of findings is made thereafter.

**Table 1**  
Descriptive Summary of Student Scores by Discipline

Discipline Area	n	Mean <sup>a</sup>	Skewness	95% CI [Mean]
Health Science	4435	47.7	-0.02	47.5–47.9
Numeracy	4430	47.9	0.21	47.6–48.1
Readings	4403	48.6	0.61	48.3–48.9

Note. Analysis relates to students whose father and/or mother's education was known (n = 4,435).

<sup>a</sup>Estimates (scores) are presented in percentages (%).

According to the results in Table 1, the students' mean percentage scores in health science, numeracy, and reading were 47.7, 47.9, and 48.6, respectively. Using a one-sample mean comparison test, the mean estimates in the various disciplines were significantly below the 50% average ( $p < 0.05$ ). These findings point to students' generally low performance in the three discipline areas.

### Predictors of Student Academic Achievement

The influence of the father and mother's education on the academic achievement of their child in reading, health science, and numeracy was modeled in a multivariate analysis using MLR clustered by region: central, eastern, western, northern, southwestern, and northeastern. Table 2 presents estimates of student academic achievement in the various disciplines. However, only data related to students whose father and/or mother's education was known (n = 4,435) were used in the analysis; a summary of findings is made subsequently.

**Table 2**  
Estimates of Student Academic Achievement in Reading, Health Science, and Numeracy Clustered by Region<sup>a</sup>

Independent Variable	Disciplines		
	Reading <sup>b</sup>	Numeracy <sup>c</sup>	Health Science <sup>d</sup>
<b>Sex</b>			
Male <sup>†</sup>	.	.	.
Female	-0.95**	-1.36**	-1.34**
<b>Age</b>			
Below 14 <sup>†</sup>	.	.	.
15–19	-2.70**	-1.48**	-1.11**
20 and Above	-5.07**	-2.22**	-4.31**
<b>Residence</b>			
Rural <sup>†</sup>	.	.	.
Small Town	2.59**	1.70**	1.16**
Large City	5.91**	4.10**	3.68**
<b>Pre-primary Schooling [months]</b>			
Never <sup>†</sup>	.	.	.
1–12	-0.40	-0.001	-0.76*
13–24	0.81*	1.60**	0.38
25 and Above	0.42	0.32	-0.62
<b>Father's Education</b>			
None <sup>†</sup>	.	.	.

Primary	0.97**	0.70*	1.51**
Secondary	1.97**	1.97**	3.62**
Post-secondary	3.16**	2.59**	3.00**
<b>Mother's Education</b>			
None <sup>†</sup>	.	.	.
Primary	0.20	0.27	-0.30
Secondary	1.28**	0.32	-0.66
Post-secondary	2.15**	1.21*	0.91
<b>Grade (any) Repetition Status</b>			
Never <sup>†</sup>	.	.	.
Once	-1.34**	-0.66**	-1.09**
Twice	-1.60**	-1.15**	-1.29**
<b>cons</b>	48.69**	48.39**	49.15**

Note. Figures presented represent beta coefficients; associations are established at 5% and 1% level; where \* p < 0.05, \*\* p < 0.01; Groups = 6.

<sup>†</sup>Reference categories adopted.

<sup>a</sup>Regions investigated were Central, East, West, North, Northeast, and Southwest.

<sup>b</sup>n = 4,410, Wald Chi-square = 1035.2, p < 0.001, ICC = 0.083

<sup>c</sup>n = 4,405, Wald Chi-square = 493.74, p < 0.001, ICC = 0.074

<sup>d</sup>n = 4,378, Wald Chi-square = 249.63, p < 0.001, ICC = 0.041

**Regression Diagnostics**

Table 3 presents the Likelihood Ratio (LR) test estimates of modeling the students' academic achievement in the various disciplines, using an ordinary MLR rather than a multilevel approach clustered by region. A summary of the findings is made subsequently.

**Table 3**  
Likelihood Ratio Test Estimates of Analysis Clustered by Region  
vs. Ordinary Multiple Linear Regression for the Three Discipline Areas

Random-Effects Parameters	Estimate	Std. Error	95% CI [Estimate]
<b>Health Science</b>			
<b>Region: Identity</b>			
sd(_cons) <sup>b</sup>	1.92	0.58	1.06–3.49
sd(Residual)	9.24	0.09	9.05–9.44
$\chi^2 = 107.47, p\text{-value} < 0.001^a$			
<b>Reading</b>			
<b>Region: Identity</b>			
sd(_cons)	2.02	0.59	1.13–3.61
sd(Residual)	6.69	0.07	6.55–6.83
$\chi^2 = 252.13, p\text{-value} < 0.001$			
<b>Numeracy</b>			
<b>Region: Identity</b>			
sd(_cons)	1.95	0.57	1.09–3.49
sd(Residual)	6.90	0.07	6.75–7.04
$\chi^2 = 249.21, p\text{-value} < 0.001$			

<sup>a</sup>Proceedings of an LR Test: whether estimated variance component is different from zero, that is, null hypothesis of zero variation due to region clustering.

<sup>b</sup>Standard deviation at the regional level

The low probability value (p < 0.05) for the LR Chi-square test in Table 3 affirms the existence of regional differentials in student academic achievement in reading, health science, and numeracy—the ICC is not equal to zero. In other words, an ordinary multiple regression should not be used to model the data; rather, a multilevel model is needed. Further, the results suggest that the random intercept model fit the data better than the random coefficient model.

In light of the fact that the normality assumption of level-1 residuals is not required for consistent estimation of model parameters, standard errors, and asymptotic normality of the estimates (Sophia & Anders, 2012), no distributional assumption diagnostic tests were carried out on the residuals.

### **Summary of the Findings**

According to the results of the multivariate assessment, using MLR clustered by region, a significant association of student performance was noted for the variables of age, sex, rural-urban location, and father and mother's education ( $p < 0.05$ ). These results are summarized as follows:

- Young sixth grade students (14 years and below) scored higher in all disciplines compared to their older counterparts (15 years and above).
- Males scored higher in all disciplines compared to females.
- Students in small towns or large cities scored higher in all disciplines compared to those in rural areas.
- Children born to mothers with secondary and post-secondary education scored higher in reading compared to those with non-educated mothers. In numeracy, students with mothers having post-secondary education scored higher compared to those with non-educated mothers.
- Children born to fathers with primary, secondary, and post-secondary education scored higher in all disciplines compared to those with non-educated fathers.
- Students who had repeated any grade (once or twice) scored lower in all disciplines compared to those who had never repeated a grade.

With regard to the interaction of variables pertaining to parents' academic qualification, no significant interaction terms were observed between father and mothers' education levels ( $p > 0.05$ ). On the other hand, variance at the regional level accounted for about 8%, 7%, and 4% of the total variance in student academic achievement in reading, numeracy, and health science, respectively.

### **DISCUSSION**

The descriptive summary of student academic achievement reveals no significant difference in student test scores in the various disciplines ( $p > 0.05$ ). Further analysis of student scores in the various disciplines using the Spearman's correlation reveals positive associations in test scores or performance by students in all combinations for all disciplines: reading and numeracy ( $r = 0.588$ ,  $p < 0.01$ ), reading and health science ( $r = 0.503$ ,  $p < 0.01$ ), and health science and numeracy ( $r = 0.391$ ,  $p < 0.01$ ). The results imply that students who scored higher in reading equally did the same in numeracy and health science, or vice versa.

The mother's education was found to have a significant influence on student academic achievement in reading and numeracy ( $p < 0.05$ ). However, the minimum level of mother's education required to predict that her child would achieve better performance in reading was secondary education, while in numeracy, it was post-secondary education. These findings suggest differences in the minimum level of mother's education required to predict the child will achieve better performance in the various disciplines. Nevertheless, the results add to literature that has reported higher academic performance among students born to educated mothers (e.g., Fayyaz & Muhammad, 2011; Jehangir, Tahir, & Saeed, 2000; Englund et al., 2004; Williams, Williams, & Ullman, 2002). Englund et al. (2004) argue that the early involvement of educated mothers in problem solving situations at the preschool level contributes to higher academic achievement of their children at later stages of schooling. However, William et al. (2002) suggest that more educated parents practice greater involvement in their children's education. Mestry (2004) interprets parental involvement as commitment to the education of the children and the role they play in school management. In an extensive review of the literature, Mestry and Grobler (2007) present parental involvement from an international perspective as including the following: participation in parent-teacher conferences and/or interactions, participation in school activities or functions, engagement in activities at home, including but not limited to homework, engagement in learners' extra-curricular activities, assisting in the selection of learners' courses, keeping abreast of learners' academic progress, reaction to academic grades, imparting parental values, and the level of parental control and autonomy of support in the home environment. In light of the fact that most households in Uganda are male-headed (UBOS, 2012), it is more likely that most of the roles mentioned above

are performed by the father. On the other hand, when making decisions about education, the “bread winners” of the home, who are predominantly fathers, tend to have a higher say with regard to the choice of schools for their child.

Though much of the focus in literature is on the mother’s education, the few studies that have investigated the influence of the father’s education on a child’s academic achievement have not yielded different results. Houtenville and Conway (2007) report a positive relationship between fathers’ education and academic achievement of their children. The results of this study reveal that the children of educated fathers have better academic achievement in all disciplines compared to their counterparts whose fathers do not have at least a primary education. Further, the minimum level of father’s education required to predict better performance of his child was primary education. These findings suggest that a lower level of father’s education, as compared to mother’s education, is required to predict better performance of the child. While secondary and post-secondary education were established as the minimum level of mother’s education required to predict better performance of a child in reading and numeracy respectively, primary level was noted as the minimum level of father’s education across all disciplines. Nevertheless, the findings support literature reporting better academic achievement by students born to educated fathers. On the other hand, the evidence of no significant interaction terms for parents’ academic qualifications suggests that the contribution of a father’s level of education towards the academic achievement of their child is independent of the mothers’.

On the other hand, sixth grade students’ performance in all disciplines varied significantly by their socio-demographic characteristics of age, sex, and rural-urban residence. Better performance was noted among young students, males, and students at urban schools ( $p < 0.05$ ). These findings suggest that parents’ higher education levels do not automatically translate into better academic achievement in all countries and disciplines. This is possibly due to differentials in the learner characteristics. Nevertheless, the results corroborate the findings of the National Assessment of Progress in Education study that investigated primary school students in Uganda (UNEB, 2011). With regard to age, learning difficulty or involvement of older students in non-academic matters works counter to performance (UNEB, 2012). Similarly, young students are associated with timely enrollment, which denotes a high degree of participation of the official school-age population (SACMEQ, 2011). In this study, the median age of students (16, range: 12–27) was higher than expected for a first grade student in Uganda. In light of the stipulated age at commencement for first grade students in Uganda, which is six years, the expected age for sixth grade students is 11 years. Older ages of the students are associated with late starters and grade (any) repetition (e.g., SACMEQ, 2011). Thus, it is not surprising that students who had repeated any grade obtained lower grades in all disciplines than their peers who had never repeated a grade.

With regard to area of residence, the 2011 UNEB report attributes the poor performance in rural schools to the higher rate of student and teacher absenteeism in these schools compared to those located in urban areas, that is, small towns or large cities. Further, a majority of rural schools and student enrollment are government aided. The schools are faced with a number of challenges that may affect student academic achievement—particularly, the increasing number of students in these schools does not match the available resources, that is, teachers and learning materials. Unlike the 2011 UNEB assessment that established significant male-female differentials in student literacy, in the results of this study, males scored higher than the females in all disciplines ( $p < 0.05$ ). With regard to numeracy particularly, girls’ lower performance is attributed to a lack of female role models—a small proportion of female teachers (8.2%) is noted to be teaching numeracy (UNEB, 2011). Nevertheless, the results of this study add to literature suggesting the influence of background factors of learners on their academic achievement in formal education (e.g., SACMEQ, 2011; UNEB, 2011; Wamala, Oonyu, & Ocaya, 2011).

In summary, although many studies have shown that parents’ education influences the academic achievement of their children, the minimum levels of the mother and father’s education required to predict that their child will achieve better performance are not the same. Further, the impact of a mother’s education on the academic achievement of her child is not consistent across various disciplines. However, this generalization may not hold across countries because of variations in the quality of education services and individual characteristics of students and their parents, among other factors.

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**NOTES**