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Parental Involvement and Children Acquisition of Literacy and Numeracy Skills in Uganda

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Abstract. The aim of the study was to investigate the relationship between parental involvement and children's acquisition of literacy and numeracy skills in Uganda. The objectives of the study were threefold; to examine the level of competence in children's literacy and numeracy skills; to establish the

relationship between parental involvement and children's competences in literacy and numeracy skills as well as to predict parental factors in determining children's competences in literacy and numeracy skills in Uganda. Secondary data from Uwezo 2021 dataset were analysed using descriptive statistics, the correlational coefficient and logistic regression analysis was used to explore the levels of competence in literacy and numeracy skills among children, the association between competence levels in literacy and numeracy and parental involvement was analysed; as well as parental factors as predictors in children's acquisition of literacy and numeracy skills were investigated. The study findings revealed that children in Uganda were at different competence levels in literacy and numeracy. Parental involvement in children's education also significantly enhanced the acquisition of basic literacy and numeracy skills. However, there was a low positive correlation between parents' participation in reading with their children and acquisition of literacy and numeracy skills. Noteworthy, findings revealed that numeracy skills of 4-16-year-olds increased with TV and mobile telephone access in households. In conclusion, parental factors play a significant role in predicting the development of literacy and numeracy abilities among children in Uganda. The odds ratio for increased literacy skills was lower in male-headed households but higher in households with parents who completed Ordinary School Certificate, Advanced School Certificate, and tertiary diploma/degree. Thus, the Ministry of Education and Sports should provide free adult education to parents in order to encourage them to be involved in their children's education. The findings of this study inform education policy review to enhance children's acquisition of basic skills in literacy and numeracy.

Keywords: Parental involvement₁, Children₂, Literacy₃, Numeracy₄ Skills₅, Uganda

Introduction

In developing countries, particularly in rural areas, a significant number of pupils continue to be excluded from educational opportunities (Hanushek & Woessmann, 2008; Mpyangu et al., 2014), additionally, the limited number of children who do have access to education consistently demonstrate poor literacy and numeracy skills. Studies have shown that more than 60 percent of primary school children in low- and middle-income countries fail to achieve minimum proficiency in literacy and numeracy skills (Mahuro & Hungi, 2016; World Bank, 2018). The lowest levels of these skills acquisition have been reported in sub-Saharan Africa (World Bank, 2018), especially among children living in rural areas (Lian et al., 2023; Mukuna & Aloka, 2020). Studies have reported similar findings for Uganda, alluding to the fact that children have weaker academic performance than their counterparts in other African countries (Okello et al., 2020; Sekiwu, 2020), particularly with those from rural areas having the worst performance (Diwakar et al., 2021; Lubaale et al. 2021; Mukuna & Aloka, 2020; Nakabugo, 2015; Okello et al., 2020). Additionally, Uganda is also reported to have one of the highest primary school dropout rates worldwide, for instance, 32.1 percent of children's complete primary education (Lubaale et al., 2021; Nakabugo, 2015; Omoeva & Gale, 2016). This could be due to the fact that their competences in literacy and numeracy are inadequate given the circumstances surrounding their home and school environment that tend to be less supportive. Yet, at an individual level, gaining literacy and numeracy skills positively enhances the employment opportunities, earnings and improved the health while at the national level, these skills facilitate the economic growth, reduce poverty, strengthen institutions, and foster social cohesion (World Bank, 2018).

Therefore, it is not surprising that consorted efforts have been made by governments, national education sectors and development partners to support the achievement of literacy and numeracy in terms of improving learning outcomes to ensure children's learning (Skwarchuk et al., 2014).

Furthermore, there has been a significant controversy surrounding the impact of parents, guardians, and caretakers on the educational outcomes and cognitive growth of students. This debate is closely intertwined with the family dynamics and the educational environment provided at home. Most notably, several correlational studies affirm that the parental involvement in supporting the children's acquisition of literacy and numeracy skills early enough, stand high chances of academic accomplishment (Aunio & Niemivirta, 2010; Salminen, 2021; Watts et al., 2014). Furthermore, in the global South, the parental involvement in children's acquisition of literacy and numeracy skills faces challenges, such as, limited time among children and parents, lack of necessary instructional resources among other factors (Golsteyn et al., 2016; Jones & Youdi, 2015; Lehl et al., 2021). This may be particularly true throughout the East African region and specifically in Uganda, a country where parents and guardians especially from both rural and urban poor households experiences are constrained to fend for the livelihood of their families amidst scarcity of resources. Moreover, some parents and guardians themselves did not even have an opportunity to obtain basic numeracy and literacy skills. Thus, their ability and interest in education matters remains unclear. In fact, not all children may have knowledge providers at home (Salac & Florida, 2022). As such, parental involvement requires a lot of commitment in terms of time, budgeting, and cooperation from other family members who may share the household labour to which the parent and guardian would directly engage.

Parental Factors Determining Children's Competences in Literacy and Numeracy Skills

Parental involvement in their children education is vital and has been widely studied (Hossain et al., 2023). Cheng et al. (2019) found out that parental factors positively impact students' achievement, regardless of their socioeconomic status. Six aspects of parental involvement stand out in literature, which include: a) academic expectations, b) support for learning, c) discussion of school matters, d) participation in school governance, e) parent-child reading, and f) emphasis on education. These factors were all positively associated with the students' achievement. The most strongly associated aspects were home- and school-based involvement, parental learning support, academic emphasis, and parent-teacher communication. As such, numerous research studies have indicated that parental involvement in their children's education is significantly and positively connected with their foundational learning skills (i.e. in reading and numeracy) (Hossain et al., 2023). However, parental involvement did not benefit students with college-educated parents or those with Grade-12 education who were not actively involved in the academic life of their children (Tan et al., 2020).

Another meta-analysis study by Pinquart and Ebeling (2020) revealed that parental expectations also predicted changes in children's academic achievement, with effects stronger than prior achievement. Factors influencing the effect of parental expectations included children's age, socioeconomic status, ethnicity, and the assessed type of expectation. Parental expectations were higher than children's achievement, and the associations were partially mediated by educational expectations in offspring, children's academic engagement, and academic self-concept. Furthermore, parental supportive behaviors also played an important role in promoting learning outcomes of their children.

Parents' socio-economic status is also an important factor. Mesmin et al. (2019) revealed that parents with higher socio-economic status offered more opportunities for their children to engage in reading. As they can have access to more books at home and diverse variety of book genres. This encourages children to start reading early enough and to develop reading habits. Conversely, children from low socio-economic backgrounds may not even watch television because their families cannot afford such gadgets. Parents prioritise teaching children the value of responsibility and financial literacy by involving them in household chores and encouraging them to save money. Consequently, children may lack reading materials, thus, undermining their ability to develop the required reading habits. As

such, children from lower socio-economic backgrounds may find the reading less enjoyable compared to their peers from high social economic status (Bonifacci et al., 2021). Naite (2021) affirms that parents' education level, age, employment and marital status had a great impact on their children's education. According to Kamal et al. (2022) the wealth index has been used as a proxy for the source of income status in previous studies and has been found to be a significant predictor of children's learning outcomes in terms of literacy and numeracy skills.

In fact, Salminen et al. (2021) affirms that a supportive home learning environment contributes towards the acquisition of literacy and numeracy skills among children. Napoli et al. (2021) also revealed that parents' education level to be a significant predictor of children's early acquisition of literacy and numeracy skills. Similarly, Hossain et al. (2023) study revealed that mothers with higher education level had a significant positive contribution towards their children's learning outcomes. Furthermore, the amount of time parents spent with their children playing or doing homework is extremely vital. However, limited information is available regarding parents' involvement with their pre-school children (Gershuny, 2020).

Generally, parents are the main resource providers. Parents often provide resources into the household for the livelihood of their children. In the Ugandan contexts, most families have limited resources due to the low socioeconomic background. Yet, the access to more resources is usually linked to better physical and mental health. Thus, children in socially advantaged positions usually have more access to education resources at their disposal, and therefore better health-related opportunities in terms of cognitive potential leading to successful enrolment and completion of primary school education (Bonifacci et al., 2021). Thus, parents are also the key providers of social support to their children.

The social support from parents may include emotional, instrumental, or informational support for each other as well as social integration. All these are factors of resilience and important family functions, which can act as a buffer to compensate external stressors. For instance, mitigating the consequences of stressors like food scarcity, parental neglect, and ill health can facilitate optimal and productive learning experiences (Alsubaie et al., 2019). Additionally, having strong social bonds provides students with a sense of purpose and a feeling of being part of a larger community. This plays a crucial role in shaping their experience in school, fostering a deep interest in their studies and ultimately encouraging them to successfully complete their primary education (Mishra, 2020).

The parent creates a social control, which is another dimension of social integration (Leah et. al., 2020). The link between the social integration and health is established via the health behaviours and it is suggested that family members have a deterrent effect on negative health behaviours, which in turn would affect their health negatively (Leah, et al., 2020). Negative health behaviours such as drug abuse and sexual violence usually arising from peer pressures. Ensuring that children are well-fed, have proper rest, maintain good health, and feel psychologically secure significantly contributes to their stability of attention in school. Consequently, this puts them in a more advantageous position to acquire the necessary skills in literacy and numeracy. Therefore, they are groomed into competent adolescents. These adolescents who are well integrated into families tend to experience stronger social control, which deters them from engaging in activities detrimental to their health. This creates resilience and enables the children to survive under all circumstances while at school until completion time (Millán-Franco et al., 2019).

Theoretical Considerations

The Epstein Theory of Parental Involvement fully known as the *Framework of Six Types of Involvement for Comprehensive Programs of Partnership and Sample Practices* by Joyce Epstein guided

this study (Epstein, 1984). The theory is experimentally verified in both academic and home environments and has been found to be suitable and it is the most widely applied on parental involvement in their children's education (Wright, 2009). It is also a reliable theory for understanding the types of parental involvement in the child's education and provides well-articulated and defined guidelines for others to follow (Salac & Florida, 2022; Wright, 2009). The Epstein framework evolved in 2009 as a functional connection between the status of parents and the success of their children in school. In this Framework, Epstein and her collaborators emphasised that it is a two-way partnership involving the family working together with educators rather than the school determining the child's education on its own. Scholar such as Wright (2009) also affirms that parents are the first teachers and role models of their children and that there is a mutual benefit by the children, parents and the school.

The Epstein Theory of Parental Involvement suggests six types of involvements that are well explained and illustrated with examples clarifying how each type of involvement works in real-life situations. Furthermore, the framework highlights the attendant set of practices and strategies; likely challenges and designs for implementation as well as expected results of parents, students and teachers for each of the six involvement levels ranging from type 1-6.

The underlined six types of involvement are: Type 1) parenting involvement that occurs when families create a supportive environment for their children's education and when schools foster strong connections with their students' families; Type 2) communicating where the involvement occurs when educators, students, and families “design effective forms of school-to-home and home-to-school communications”; Type 3) volunteering is an aspect where involvement occurs when educators, students, and families “recruit and organise parent help and support” and count on parents as an audience for student activities; Type 4) learning at home where involvement occurs when information, ideas, or training are provided to educate families about how they can “help students at home with homework and other curriculum-related activities, decisions, and planning”; Type 5) decision making that is described by Epstein as involvement that occurs when schools “include parents in school decisions” and “develop parent leaders and representatives”; Type 6) collaborating with the community where the involvement occurs when community services, resources, and partners are integrated into the educational process to “strengthen school programs, family practices, and student learning and development.” Thus, the Epstein Theory of Parental Involvement provides a theoretical lens for the realisation of positive educational experiences for children. It seeks to explain the relationship between parenting and schooling while emphasising it as a process that involves many factors which should be well articulated. It also reflects an interdependent view of community-family-school influence where parental involvement practices may lead to so many intended and unintended child outcomes. This study considers only first four types namely 1) parenting 2) communicating 3) volunteering and 4) learning at home.

Indeed, parents are the first teachers of their children and that learners accomplish a lot when they experience parental support. Factors such as decision-making and effective parent-child communication are some of the home conditions that support a child's ability to learn. Working with the Epstein Theory of Parental Involvement provides valuable insights into the child's perception and respect towards their parents well knowing that they are supervising his/her education. Thus, it is one way of building positive qualities and inculcating a sense of belonging with beliefs, values and habits that are taught by the parents.

While issues relating to parental involvement in children's acquisition of numeracy and literacy have been studied in other contexts and regions worldwide, not much progress has been made in Uganda's context. Yet, it is an important step and effective strategy to enhance early social competency

that may promote a child's academic achievement (Golsteyn, 2016). This article therefore investigates the role of parents in children's acquisition of basic literacy and numeracy skills as part of conceptualisation of learning.

Research Problem

Parental involvement in their children's educational matters is valued in all cultures across the world. The importance of parents in ensuring that their children achieve and succeed in their academic endeavours is highly valued by the society, educators, and particularly governments. Some studies have pointed out that parents have limited time and face other related challenges restraining them to participate in their children's education (Golsteyn et al., 2016; Jones & Youdi, 2015). Researchers divide parental participation into two categories: at home and at school. Therefore, parents are encouraged to participate in their children's education by encouraging them to engage in a variety of activities both at home and at school. For instance, in activities such as feeding, providing educational resources, motivating children to attend class each day, offering emotional assistance and counselling among others (Lehrl et al., 2021). All of this is done to ensure that children achieve their educational objectives. Although parents are expected to play a major role in children's numeracy and literacy, there is also evidence in Uganda that parental involvement is minimal despite its importance. The Uwezo secondary data clearly indicated the lack of parents' involvement in their children's learning of numeracy and literacy. However, it is not clear whether the minimal parental involvement has any influence on children's performance. Therefore, this study addressed the relationship between parental involvement and children's acquisition of literacy and numeracy skills.

Research Focus

This study focused on parental involvement in children acquisition of numeracy and literacy skills in Uganda looking at children aged between 4 to 16 years that have studied in public, private and community primary schools during the first school COVID-19 lock down.

Research Aim

The aim of the study was to investigate the relationship between parental involvement and children's acquisition of literacy and numeracy skills in Uganda.

Specific Objectives

1. To examine the level of competence in children's literacy and numeracy skills in Uganda
2. To establish the relationship between parental involvement and children's competences in literacy and numeracy skills in Uganda
3. To predict parental factors determining children's competences in literacy and numeracy skills in Uganda

Hypotheses

- *Hypothesis 1:* There is a difference in the level of competences in literacy and numeracy skills among children in Uganda
- *Hypothesis 2:* There is a relationship between parental involvement and children's academic achievement in literacy and numeracy skills in Uganda
- *Hypothesis 3:* Parental factors predict children's competences in literacy and numeracy skills among pupils in Uganda

Research Methodology

This study utilised secondary data obtained from the Uwezo database (<https://uwezouganda.org/publications/datasets/>) to examine the impact of parental school involvement on the literacy and numeracy skills of children in Uganda during the initial COVID-19 lockdown. The objective was to gain insights into the degree of parental engagement in their children's education amidst the pandemic. Data collection involved trained volunteers deployed by Uwezo (Uganda) across various geographical areas in the four regions of Uganda (Western, Central, Northern, and Eastern), ensuring a comprehensive coverage of information.

Sample and Participants

Although in total, there were 19824 children who participated in the Uwezo study only a sample of 15662 children was considered for this study because these had fully answered all the relevant questions. The 15662 children were from public, private and community primary schools in Uganda aged between 4 and 16 years. This is representative sample drawn from across different regions in Uganda. Respondents were randomly selected from sampled village areas using village volunteers following guidelines from Uganda Bureau of Statistics. Each head of the identified household was required to avail all children under the identified age bracket (4-16 years) who took part in the study. Only children who had complete data on all measured variables constituted the study sample.

Instrument and Procedure

The Uwezo Data Questionnaire 2021 was used and it comprised of three assessment sheets (House hold assessment sheet, child assessment sheet and school assessment sheet) (Uwezo Uganda, 2021a). However, this study focused on child assessment and household assessment survey which were utilised to answer the study objectives.

Child Data Sheet

The assessment sheet comprised various sections, among them the sections on demographic characteristics. Items on numeracy and literacy were derived from Uwezo Assessment Booklet for Primary 2 level (Uwezo Uganda, 2021b). Literacy skills were assessed using six levels; i.e., level 1- pre-literacy (Non-reader), level 2- letter, level 3-word, level 4-paragraph, level 5- story and level 6- comprehension level (See H1801 to H1802). Numeracy had seven levels; i.e., Level 1 pre-numerate (Non-numerate), level 2- matching, level 3- number recognition 10-99, level 4- addition, level 5- subtraction, level 6- multiplication and level 7- division (See H1805). Children could only advance to the next level if they correctly answered questions from the previous level. Child assessment sheet also had information on parental involvement assessed in terms of someone reading with the children at home (H1500) and someone at home helping with mathematics tasks (H1600).

Household Survey Sheet

The Uwezo Data Questionnaire on household assessment comprised of different sections and only demographic information that included gender (H007), educational background (H009, source of income (H013, socio-economic activity (V200), number of meals (H), source of lighting used were considered for the study.

Procedure

After gaining access to Uwezo database (<https://uwezouganda.org/publications/datasets/>), the researchers extracted and organised variables that were relevant to the study objectives which included: the gender (H302), the age (H303) and the school status (H700); the basic learning levels in terms of literacy (H1801-H1802) and numeracy (H1805) were used in this study. This data was entered into excel to ease matching household data and child data sets. Only children that had been assessed in both literacy and numeracy skills and had complete data were considered for analysis. This secondary data had gone through ethical clearance from UNCST (SS959ES).

Data Analysis

Data analysis was based on three objectives that were set for this study. The researchers first examined children's competency skills (aged 4-16 years) in literacy and numeracy using descriptive analysis in terms of frequencies and percentages. Secondly, the study investigated the relationship between parental involvement and children's competences in literacy and numeracy skills. Using SPSS version 26 the researchers ran a Spearman Rho correlation coefficient. This focused on data regarding if parents do read with their children and also give them tasks that involve mathematics at home. Finally, a Logistic regression analysis was conducted to predict parental factors that determine children's competences in literacy and numeracy skills. Parental factors were derived from household demographic data that included information on gender, income and education level, home learning environment that included school items, television, radio, computer, source of lighting system; and diet which included how many meals are eaten per day (<https://uwezouganda.org/publications/datasets/>).

Research Results

This section presents the results based on the three study objectives that aimed to determine: (1) 1) What is the extent of variation in literacy and numeracy competences among pupils?; 2) Is there a correlation between parental engagement and children's academic performance in literacy and numeracy?; 3) To what extent can parental factors reliably predict the competences of children in literacy and numeracy skills in Uganda?

Prior to presenting and discussing the findings, it is crucial to provide an overview of the children's socio-demographic characteristics who partook in the study. Responses from a total of 15662 children aged between 4 to 16 years were considered for analysis. The average age of the children was 9.76 ± 3.62 years. In particular, 78.9% of the children attended in day schools, 4.4% in boarding schools; 50.8% in government-aided schools, 30.7% in private schools and 1.9% in community schools. 70.4 % of the children were also from male headed households and 70.4% of households, farming was the major source of income. This information aided in the interpretation of results. Furthermore, it should be noted that Uganda follows a British Education Systems, that is, Primary education, lower secondary education, upper secondary education and Tertiary (college and university) education in this order. On completion of each of level of education, candidates are given terminal examination and accordingly leading to the award of certificates as follows: Primary Leaving Certificate; Ordinary School Certificate, Advanced School Certificate and diploma/degree.

Results study objective 1: The level of Competence in Literacy and Numeracy skills among children aged 4-16 years in Uganda

The data analysis was guided by Hypothesis 1. "There is a difference in the level of competences in literacy and numeracy among children in Uganda."

Table 1 shows the numbers of children aged 4-16 years who participated at different levels of literacy and numeracy competences. Findings in Table 1, clearly indicate that the number of children dropped at each level of increasing difficulty in literacy and numeracy competences. The findings revealed that every 4 out of 10 (42.2%) children in Uganda did not have any literacy skill. Only 1598 (17.6%) children could actually read and recognize letters, out of which 425(26.5%) children could read words and only 223 (52.4%) could read a paragraph. Of which only 112 (50.2%) could at least read a story and of which 91 (80.2%) could comprehend the story read. Likewise, close to one third of the children aged 4-16 years 29.1% did not have any numeracy skill. Findings in Table 1 indicated that only 1322 (11.9%) children could match numbers, of which 979 (11.9%) could do number recognition, and only 88 children could do division of numbers. Certainly, according to this wide variation in the level of literacy and numeracy skills among children aged 4-16 years in Uganda, therefore, our Hypothesis 1 was accepted.

Table 1

Literacy and Numeracy Competences Among Children Aged 4–16 in Uganda

Literacy skills	Number of participants	Frequency (n=)	Percentage
Non-reader	15662	6615	42.2
Letter	9047	1598	17.6
Word	1598	425	26.5
Paragraph	425	223	52.4
Story	223	112	50.2
Comprehension	112	91	81.2
Numeracy skills	Number of participants	Frequency (n=)	Percentage
Non-numerate	15662	4555	29.1
Matching	11107	1322	11.9
Number recognition	1322	979	74
Addition	979	525	53.6
Subtraction	525	312	59.4
Multiplication	312	124	39.7
Division	124	88	70.9

Study Objective 2: Relationship between Parental Involvement and Children's Competence in Literacy and Numeracy Skills

The data analysis Hypothesis 2. There is a relationship between parental involvement and academic achievement in literacy and numeracy skills among children in Uganda.

There was a low positive correlation between parents who read with/for children and literacy skills $r(15660) = .208$, $p\text{-value} .001$ and a low positive correlation between parents who give mathematical tasks to children with literacy skills $r(15660) = .242$, $P\text{-Value}-.001$. The findings reveal that there is a positive significant correlation between parental involvement and children's outcomes in numeracy and literacy. Indeed, our hypothesis 2 was accepted, because of positive significant relationships between the variables.

However, the correlation is low simply because the majority of the data was collected from rural areas where parents may rarely get involved in supporting of their children in numeracy and literacy. Possibly, if data was mainly collected from an urban setting, the findings would be different. Notably, very few parents can also afford to provide scholastic materials. Besides, the majority of the parents had very low education since most of them stopped at primary level so, their capacity to support children in numeracy and literacy is low.

Parental Factors as Predictors of Literacy Skills of Children aged 4-16 years in Uganda

This data analysis was guided by Hypothesis 3 on Parental factors as predictors of literacy and numeracy skills among children aged between 4-16 years in Uganda.

Table 2 shows parental factors as predictors of literacy skills among children aged 4-16 years in Uganda. The findings in Table 1 revealed that literacy skills of children were found to increase with presence of a Television (OR=1.3, p-value 0.001) and mobile telephones in the household (OR=1.3, p-value 0.001). The odd ratio for increased literacy skills were lower in male headed households than female headed households (OR=0.9, p-value 0.001) and high among children from households whose heads completed Ordinary level School Certificate (OR=1.5, p-value 0.004), completed Advanced level School Certificate (OR=1.8, p-value 0.001) and completed tertiary Diploma (OR=1.6, p-value 0.002). The odd ratio for increased literacy skills were high among children from households that use electricity (OR=1.9, p-value 0.001) and solar (OR=1.3, P-Value 0.001) as the main source of lightening. In terms of schooling status, children from government-aided schools (OR=2.5, p-value 0.001) and private owned schools (OR=1.6, p-value 0.001) were more likely to have increased literacy skills than those from community owned schools.

Table 2

Parental Factors as Predictors of Literacy Skills in Children Aged 4–16 years

Variable	OR	Sig.	95% Confidence Interval	
			Lower Bound	Upper Bound
Number of TVs	1.3	0.001	0.159	0.365
Number of Radios	1.0	0.041	9.636E-6	0.0011
Number of Computers in household	1.1	0.152	-0.027	0.170
Number of Mobile Telephones in household	1.2	0.001	0.135	0.204
Number of Table and chairs	1.0	0.002	0.006	0.025
Number of meals eaten per day	1.0	0.334	-0.093	0.032
Sex of household head	1.0			
Male	0.9	0.001	-0.242	-0.079
Female	0 ^a			
Education Level of household head	1.0			
None	1.1	0.529	-0.183	0.355
Completed Primary Leaving Certificate	1.1	0.480	-0.168	0.357
Completed Ordinary School Certificate	1.5	0.004	0.131	0.687
Completed Advanced School Certificate	1.8	0.001	0.227	0.959
Completed Tertiary Diploma/Degree	1.6	0.002	0.182	0.816

Do not know	0 ^a			
Main source of income for the household	1.0			
Farming	0.8	0.022	-0.503	-0.040
Salary Earner	1.0	0.819	-0.268	0.339
Trading/ Business	1.1	0.419	-0.148	0.356
Other (Specify)	0 ^a			
Is the school government-aided, private, community	1.0			
government-aided	2.5	0.001	0.656	1.154
Private	1.6	0.001	0.242	0.748
Community	0 ^a			
Main Source of lighting used in the house	1.0			
Electricity	1.9	0.001	0.435	0.800
Solar	1.3	0.001	0.136	0.385
Wick Lantern (tadooba)	1.2	0.007	0.050	0.312
Others	0 ^a			

When it comes to gender, there was a notable correlation indicating that females tend to make a larger contribution to literacy when compared to males (OR= 0.9, p-value 0.001). However, number of females (29.6%) in the data was less than a quarter as compared to their male counterparts (70.4%). Thus, there were more male headed households as compared to those for female headed households. This might have disadvantaged most of the children to gain the basic literacy and numeracy skills, given that females parents heading households made greater contribution compared to their male counterparts.

Parental Factors as Predictors of Numeracy Skills of Children aged 4-16 years in Uganda

Table 3 shows parental factors as predictors of numeracy skills of children aged 4-16 years. The findings in Table 3 revealed that numeracy skills of children aged 4-16 years were found to increase with increased access to TVs (OR=1.3, p-value 0.001) and Mobile Telephones in the household (OR=1.2, p-value 0.001). The odd ratio for increased numeracy skills were lower in male headed households than female headed households (OR=0.9, p-value 0.003) and high in children from households whose heads completed Ordinary School Certificate (OR=1.7, p-value 0.001), completed Advanced School certificate (OR=2.2, p-value 0.001) and completed tertiary (OR=1.8, p-value 0.001). The odd ratio for increased Numeracy skills were high in children from households that use electricity (OR=1.3, p-value 0.001) as the main source of lightening and in children from government-aided schools (OR=2.3, p-value 0.001).

Table 3

Parental Factors as Predictors of Numeracy Skills of Pupils Aged 4–16 Years

Variable	OR	Sig.	95% Confidence Interval	
			Lower Bound	Upper Bound
Number of TVs	1.3	0.001	0.142	0.345

Number of Radios	1.0	0.129	-4.879E-5	0.001
Number of Computers in HH	1.1	0.287	-0.044	0.149
Number of Mobile Telephones in HH	1.2	0.001	0.111	0.179
Number of Table and chairs	1.0	0.002	0.005	0.024
Number of meals eaten per day	1.0	0.258	-0.096	0.026
Sex of household head	1.0			
Male	0.9	0.003	-0.201	-0.041
Female	0 ^a			
Education Level of HH head	1.0			
None	1.2	0.115	-0.052	0.477
Completed Primary Leaving Certificate	1.3	0.053	-0.003	0.513
Completed Ordinary School Certificate	1.7	0.001	0.234	0.781
Completed Advanced School Certificate	2.2	0.001	0.430	10.157
Completed Tertiary Diploma/Degree	1.8	0.001	0.270	0.897
Do not know	0 ^a			
MAIN source of income for the household	1.0			
Farming	0.9	0.436	-0.321	0.138
Salary Earner	1.2	0.293	-0.139	0.461
Trading/ Business	1.1	0.316	-0.122	0.377
Other (Specify)	0 ^a			
Is the school government-aided, private, community	1.0			
government-aided	2.3	0.001	0.624	1.081
Private	1.3	0.024	0.035	0.500
Community				
MAIN Source of lighting used in the house	1.0			
Electricity	1.3	0.001	0.121	0.478
Solar	1.1	0.051	0.001	0.241
Wick Lantern (tadooba)	1.0	0.500	-0.083	0.170
Others	0 ^a			

Hypothesis 3 states that parental factors are the predictors of children's literacy and numeracy skills among pupils in Uganda. Our findings support this hypothesis, as we discovered that parental factors indeed predict children's competence in literacy and numeracy among children in Uganda.

However, parental factors including number of radios, numbers of computers, numbers of meals eaten per day, that are usually taken as given in most developed countries is not the case in Ugandan context. Considering that the data was primarily collected in rural settings, it is evident that many parents could not afford or prioritise these gadgets. Generally, there are many households with large family size who could not afford more than one meal a day. In Uganda the poverty levels are higher in

rural settings compared to the urban (UBOS, 2022). These aforesaid parental factors were found to be insignificant in both literacy and numeracy skills of children aged 4-16 years.

Discussion

Parental factors and parental involvement play a significant role in enhancing children's competencies in literacy and numeracy. There was a difference in levels of competences in literacy and numeracy among children aged 4-16 in Uganda, and thus, the Hypothesis 1 was accepted. Indeed, the findings of this study revealed that the availability of equipment that aid learning such as television, mobile telephones, tables, chairs, electricity were important in enhancing children's learning of literacy and numeracy. This is comprehensible as these resources provide an ideal learning environment for children, particularly in the comfort of their own homes. For instance, many educational programs are broadcast via television. Children are also capable of accessing educational materials from the Internet using mobile phones even though not all children have an opportunity to have access to the gadgets. Lighting from electricity is crucial for children to be able to read and do literacy and numeracy tasks for long period of time. However, not all families have access to electricity to aid children's reading and doing literacy and numeracy tasks. Others may not afford this source of light. Notably, the source of light especially in the rural setting for some of the families include light from the moon which is naturally God given but seasonally available. It is also insufficient for reading. Others would be alternative sources of light that is commonly used in the rural setting in the Uganda context may require using paraffin candle, which may not be affordable in the required amount for some families to enable the children use it to read and do literacy and numeracy tasks. Furthermore, many families will strive to be more cost-effective, as well as prioritise the health of their children by discouraging regular use of this light source for reading. The findings of this study showed positive significant relationship between parental involvement and children's academic achievement in literacy and numeracy skills in Uganda, and thus, the Hypothesis 2 was also accepted. This study has also revealed that parents' involvement was connected with parents' gender and level of education, subsequently all enhance children's achievement in literacy and numeracy. This finding is in line with Hossain et al. (2023) study. The results of this study also concur with Naite (2021) that the parental income level had no impact on the level of parental involvement in their children's education. The income was found to be insignificant in contributing to numeracy and literacy skills. This finding seems to be out of line because the income of parents did not contribute to children's literacy and numeracy skills. And yet, under normal circumstances, parents with higher incomes are most likely to afford the securing/acquiring of educational gadgets and equipment such as computers, radios, and TVs. This may offer higher chances of increasing the rate at which children would perform better in literacy and numeracy, even in circumstances where parents have limited time and face other related challenges restraining them to physically participate in their children's education as affirmed by some scholars (Golsteyn et al., 2016; Jones & Youdi, 2015).

The findings also revealed that parental factors predict acquisition of and are vital in promoting children's competencies in literacy and numeracy and thus, the Hypothesis 3 was also accepted. These findings are also in agreement with different scholars such as Lin et al. (2023) and Napoli et al. (2021) who notably argue that an enriching home environment with educated parents enhance (Kong & Yasmin, 2022; Salminen, 2021) enhances children's acquisition of numeracy and literacy skills.

Conclusions and Implications

The findings suggest that government support is necessary to assist parents from poverty-stricken households in acquiring essential equipment for their homes.

- i. There should be a strategy to facilitate households to acquire items such as television, mobile phones, tables and chairs materials as this will enhance children's competences in literacy and numeracy skills. Since media enhances literacy and numeracy radio network/signals should be strengthened in rural areas to contribute to literacy and numeracy.
- ii. Parents who have gone to school tend to influence competences in literacy and numeracy skills of their children. Therefore, the Ministry of Education and Sports should avail adult education to parents on a zero cost to enhance their education level.
- iii. The main source of lighting played a key role in children's competences in literacy and numeracy. As a result, the Ministry of Energy and rural electrification should formulate effective strategies to ensure that every household has access to electricity or solar energy, thereby facilitating the improvement of children's numeracy and literacy skills.

Suggestions for Future Research

Given that this study was conducted in a rural setting, there is need to conduct a similar study in an urban setting. A comparative study is recommended on parental involvement in 's numeracy and literacy in both rural and urban settings.

This study was conducted during the COVID-19 lock down period in the year 2021 when children were at home for a long period of almost 2 years. A similar study can be conducted at a time when children are under the normal school holidays and then compare results. Possibly, the children's extended stay during the COVID -19 lockdown many of them had actually somehow forgotten some important aspects of what they had studied before the lockdown period.

Future the research could also focus on pupils that are currently attending boarding school even if in this study there might have been a few children in boarding schools given the period in which it was conducted.

Moreover, given the vulnerability of pupils during the process of acquiring numeracy and literacy skills especially in their home setting, further research is needed of offering opportunities for children to share their own perceptions and lived experiences. This should also involve the attention on the ethical responsibility of the education service providers, including the government and the different categories of leaders that support on children's needs.

It is also worth conducting a similar study focusing on vulnerable children such as those living with various forms of disability, the orphans and vulnerable children who are most likely to miss or drop out of school. Given the different challenges they face /experience as compared to other normal children who might be living with their parents.

Further research is also needed to probe participants on how they utilise different materials and gadgets towards to enhance literacy and numeracy skills among children.

Limitations

This study focused on the data collected solely by Uwezo-Uganda. The researchers had a strong desire to directly engage with the study participants, including both children and their parents or guardians, in order to gain a deeper insight into their emotions, experiences, viewpoints, and perspectives on a broader spectrum of study factors beyond those encompassed by Uwezo.

Consequently, future researchers may consider interacting with the study participants to enhance their understanding.

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References

- Alsubaie, M. M., Stain, H. J., Webster, A. D., & Wadman, R. (2019). The role of sources of social support on depression and quality of life for university students. *International Journal of Adolescence and Youth*, 24(4), 484–496. <https://doi.org/10.1080/02673843.2019.1568887>
- Aunio, P., & Niemivirta, M. (2010). Predicting children's mathematical performance in grade one by early numeracy. *Learning and individual differences*, 20(5), 427–435. <https://doi.org/10.1016/j.lindif.2010.06.003>
- Bonifacci, P., Compiani, D., Affranti, A., & Peri, B. (2021). Home literacy and numeracy interact and mediate the relationship between socio-economic status and early linguistic and numeracy skills in preschoolers. *Frontiers in Psychology*, 12, Article 662265. <https://doi.org/10.3389/fpsyg.2021.662265>
- Cheng, C. H., Wang, Y. C., & Liu, W. X. (2019). Exploring the related factors in students' academic achievement for the sustainable education of rural areas. *Sustainability*, 11(21), Article 5974. <https://doi.org/10.3390/su11215974>
- Diwakar, V., Eichsteller, M., & Shepherd, A. (2021). *Education, resilience and sustained poverty escapes. Synthesis report of sub Saharan Africa*. USAID. <https://dl.orangedox.com/YtX9CwHs6VRcxoygaD>
- Epstein, J. L. (1984). School policy and parent involvement: Research results. *Educational Horizons*, 62(2), 70–72. <https://www.jstor.org/stable/42925842>
- Gershuny, J. (2020). *Changing times: Work and leisure in post-industrial society*. Oxford: Oxford University Press.
- Golsteyn, B. H. H., Vermeulen, S., & de Wolf, I. (2016). Teacher literacy and numeracy skills: International evidence from PIAAC and ALL. *De Economist*, 164, 365–389. <https://doi.org/10.1007/s10645-016-9284-1>
- Hanushek, E. A., & Woessmann, L. (2008). The role of cognitive skills in economic development. *Journal of Economic Literature*, 46(3), 607–668. <https://doi.org/10.1257/jel.46.3.607>
- Hossain, M. I., Haq, I., Hossain, M. S., Habib, M. J., Islam, F. B., Roy, S., & Rahman, M. (2023). Factors associated with early literacy and numeracy development among children under five years in Bangladesh: multivariate two-level mixed effect approach. *International Journal of Social Economics*, 50(3), 345–358. <https://doi.org/10.1108/IJSE-10-2021-0595>
- Jones, S., & Youdi, S. (2015). Does family background matter for learning in East Africa?. *Africa Education Review*, 12(1), 7–27. <https://doi.org/10.1080/18146627.2015.1036540>

- Kamal, A., Amjad, N., Yaqoob, U., Saud, N., Ijaz, M., Khan, I., & Andualem, M. (2022). Role of socioeconomic and parental involvement factors on children foundational learning skills based on MICS (2017–2018) data Punjab, Pakistan. *Scientific Reports*, 12(1), Article 10313. <https://doi.org/10.1038/s41598-022-13540-3>
- Kong, C., & Yasmin, F. (2022). Impact of parenting style on early childhood learning: Mediating role of parental self-efficacy. *Frontiers in Psychology*, 13, Article 928629. <https://doi.org/10.3389/fpsyg.2022.928629>
- Leah, A. J., Kim, M. E., & Kattari, D. L. (2020). Defund the police: Moving towards an anti-carceral social work. *Journal of Progressive Human Services*, 32(1), 37–62. <https://doi.org/10.1080/10428232.2020.1852865>
- Lehrl, S., Linberg, A., Niklas, F., & Kuger, S. (2021) The home learning environment in the digital age — Associations between self-reported “Analog” and “Digital” home learning environment and children’s socio-emotional and academic outcomes. *Frontiers in Psychology*, 12, Article 592513. <https://doi.org/10.3389/fpsyg.2021.592513>
- Lian, Y., Xiaojun, H., & Cuiling, W. (2023). Look for the meaning of rural school work: qualitative study on identity of comprehensive teachers in rural primary schools in China. *Frontiers in Psychology*, 13, Article 1065906. <https://doi.org/10.3389/fpsyg.2022.1065906>
- Lin, X., Yang, W., Xie, W., & Li, H. (2023). The integrative role of parenting styles and parental involvement in young children’s science problem-solving skills. *Frontiers in Psychology*, 14, Article 1096846. <https://doi.org/10.3389/fpsyg.2023.1096846>
- Lubaale, Y. A. M., Nakabugo, G., & Nassereka, F. (2021). Learning outcome in literacy and numeracy in Uganda: Mining Uwezo assessment data to demonstrate the importance of maternal education. *IASSIST Quarterly*, 45(3–4). <https://doi.org/10.29173/iq1001>
- Mahuro, G. M., & Hungi, N. (2016). Parental participation improves student academic achievement: A case of Iganga and Mayuge districts in Uganda. *Cogent Education*, 3(1), Article 1264170. <https://doi.org/10.1080/2331186X.2016.1264170>
- Mesmin, D., Hanselman, P., Jenny, B., & Elizabeth, T. (2019). Do student mindsets differ by socioeconomic status and explain disparities in academic achievement in the United States?. *AERA Open*, 5(3). <https://doi.org/10.1177/2332858419857706>
- Millán-Franco, M., Gómez-Jacinto, L., Hombrados-Mendieta, I., González-Castro, F., & García-Cid, A. (2019). The effect of length of residence and geographical origin on the social inclusion of immigrants. *Psychosocial Intervention*, 28(3), 119–130. <https://doi.org/10.5093/pi2019a10>
- Mishra, S. (2020). Social networks, social capital, social support and academic success in higher education: A systematic review with a special focus on ‘underrepresented’ students. *Educational Research Review*, 29, Article 100307. <https://doi.org/10.1016/j.edurev.2019.100307>
- Mpyangu, C. M., Ochen, E. A., Onyango, E. O., & Lubaale, Y. A. M. (2014). *Out of school pupils study in Uganda*. UNICEF. <https://doi.org/10.1016/j.jiec.2016.01.036>
- Mukuna, K. R., & Aloka, P. J. O. (2020). Exploring 'educators' challenges of online learning in COVID-19 at a rural school, South Africa. *International Journal of Learning, Teaching and Education Research*, 19(10), 134–149. <https://doi.org/10.26803/IJLTER.19.10.8>

- Naite, I. (2021). Impact of parental involvement on children's academic performance at crescent international school, Bangkok, Thailand. *IOP Conference Series: Earth and Environmental Science*, 690(1), Article 012064. <https://doi.org/10.1088/1755-1315/690/1/012064>
- Nakabugo, M. G. (2015). Towards equitable quality basic education in Uganda: Insights from Uwezo learning assessment data. *Journal of International Cooperation in Education*, 17(2), 23–35. <https://doi.org/10.15027/40830>
- Napoli, A. R., Korucu, I., Lin, J., Schmitt, S. A., & Purpura, D. J. (2021). Characteristics related to parent-child literacy and numeracy practices in preschool. *Frontiers in Education*, 6, Article 535832. <https://doi.org/10.3389/feduc.2021.535832>
- Okello, J., Angol, D., Mwesigwa, D., & Student, M. A. (2020). Factors affecting academic performance of pupils in universal primary education (UPE) schools in Uganda. *South Asian Journal of Development Research*, 3(1), 1-13. https://aiipub.com/wp-content/uploads/2020/08/SAJDR-200717-021033_fp1.pdf
- Omoeva, C., & Gale, C. (2016). Universal, but not free: Household schooling costs and equity effects of Uganda's universal secondary education policy. *International Journal of Educational Development*, 50, 41–50. <https://doi.org/10.1016/j.ijedudev.2016.05.007>
- Pinquart, M., & Ebeling, M. (2020). Parental educational expectations and academic achievement in children and adolescents — A meta-analysis. *Educational Psychology Review*, 32, 463–480. <https://doi.org/10.1007/s10648-019-09506-z>
- Salac, L. M., & Florida, J. U. (2022). Epstein model of parental involvement and academic performance of learners. *European Online Journal of Natural and Social Sciences*, 11(2), 379–386. <https://european-science.com/eojnss/article/view/6398>
- Salminen, J., Khanolainen, D., Koponen, T., Torppa, M., & Lerkkanen, M. K. (2021). Development of numeracy and literacy skills in early childhood — A longitudinal study on the roles of home environment and familial risk for reading and math difficulties. *Frontiers in Education*, 6, Article 725337. <https://doi.org/10.3389/feduc.2021.725337>
- Sekiwu, D. (2020). Investigating the relationship between school attendance and academic performance in universal primary education: The case of Uganda. *African Educational Research Journal*, 8(2), 152–160. <https://doi.org/10.30918/aerj.82.20.017>
- Skwarchuk, S. L., Sowinski, C., & LeFevre, J. A. (2014). Formal and informal home learning activities in relation to children's early numeracy and literacy skills: The development of a home numeracy model. *Journal of Experimental Child Psychology*, 121, 63–84. <https://doi.org/10.1016/j.jecp.2013.11.006>
- Tan, C. Y., Lyu, M., & Peng, B. (2020). Academic benefits from parental involvement are stratified by parental socioeconomic status: A meta-analysis. *Parenting*, 20(4), 241–287. <https://doi.org/10.1080/15295192.2019.1694836>
- UBOS. (2022). *The Uganda demographic and healthy survey report (UDHS) – 2022*. <https://www.ubos.org/wp-content/uploads/2023/12/The-Uganda-Demographic-And-Health-Survey.pdf>

- Uwezo Uganda. (2021a). *Data questionnaire for assessment of numeracy and literacy*. <https://uwezouganda.org/>
- Uwezo Uganda. (2021b). *Assessment booklet for primary 2 level on numeracy and literacy*. <https://uwezouganda.org/>
- Watts, T. W., Duncan, G. J., Siegler, R. S., & Davis-Kean, P. E. (2014). What's past is prologue: Relations between early mathematics knowledge and high school achievement. *Educational Researcher*, 43(7), 352–360. <https://doi.org/10.3102/0013189X14553660>
- Wright, T. (2009). *Parent and teacher perceptions of effective parental involvement* [Unpublished doctoral dissertations]. Liberty University. <https://digitalcommons.liberty.edu/doctoral/198/>
- World Bank. (2018). *World development report 2018: Learning: To realize education's promise*. Washington, DC: World Bank. <https://www.worldbank.org/en/publication/wdr2018>