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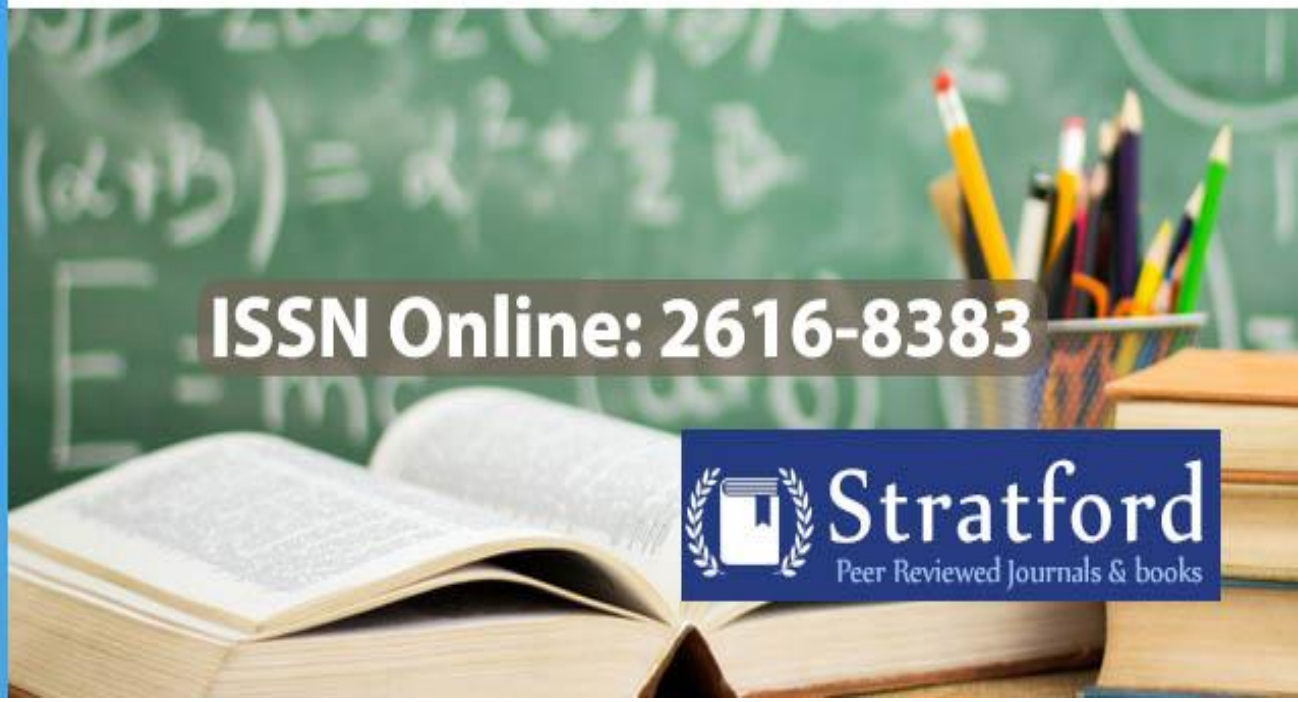

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Effect of Early Childhood Education on Cognitive Development of Pupils in Lower Primary Education in Rwanda

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Abstract

Enrolling in early childhood education plays a significant role in cognitive development of pupils in lower primary education. This implies that the lower level of cognitive development of pupils in lower primary school can be experienced by children who did not attend early childhood education. The objective of this paper was to establish the effect of ECE on cognitive development of pupils in lower primary education in Kamonyi district in Rwanda. This paper employed correlation research design. The target population was 260 people corresponding to the sample size of 158 respondents that was obtained by using Solvin's formula. Questionnaires and guided interviews were used as data collection instruments. The findings revealed that that the average of 13.52% of teachers agreed on accessibility, affordability and availability of early childhood education in Kamonyi district and the majority of respondents agreed on affordability of ECE schools in Kamonyi district as was presented by the mean of 2.85 and the standard deviation of 1.31. It was also found that the average of 14.7% of teachers agreed that pupils in lower primary education in Kamonyi indicate a standard level of cognitive development and the majority of 29.5% of teachers with the mean of 2.79 and the standard deviation of 1.36 agreed that there is a standard level of reasoning in lower primary education in Kamonyi district. The results showed that parental involvement is able to affect is 26.5% of the variations in the cognitive development of pupils in lower primary education in Kamonyi district and the remaining 73.5% can be explained by other factors. The study concluded that there is a statistical significance relationship between the variables of early childhood education and those of cognitive development of pupils in lower primary education. This study recommended that parents should be encouraged to enroll their children in ECE and teachers should improve their teaching approaches so as to improve children's intellectual capacity.

Keywords: *Cognitive development, early childhood, early childhood education and lower primary education.*

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1.1 INTRODUCTION

Globally, development of youths cognitively, can be rooted from education of early childhood as make the individual future development. The life experience of people especially young children, sometimes become a burden to education development to children studying in primary schools and other educational levels (Morrison, 2007). Despite, one of the children may lose some potentiality and effectiveness towards to educations so as to sustain their cognitive development (Young & Richardson, 2007).

In India, this was related to early childhood education and indicated that, having effective management of time to provide education to infancy, experience a high level of cognitive development as well as emotional development (Saul, 2018). Though, in developing countries, children are not aware of making up their cognitive development effectively. Saul (2018), reported that quality and affordability of early childhood education are not widely available in the rural areas of India.

Mustard (2013) noted that public pre-schools and kindergartens class receive necessary education later within in their lives. Vargas-Baron (2013) revealed that private and kindergartens in USA indicate to be expensive in provision of education and effective delivery of designed school curriculum. Therefore, the households could not manage the effective provision of ECE to their children as they are ready to promote their children' welfare that should be settled through education development though, they meet various challenges that may affect effective development of ECE and also affect the cognitive aspect among youths (Violet, 2017).

In Africa, Marito and Judith (2008) revealed that Early Childhood Education (ECE) is affected by low income capacity of households. Assmara (2008) indicated that ECE can greatly benefit from increasing public recognition respect and funding of various of education stakeholders. Barnett et al. (2011) revealed that funding ECE public increases the public recognition of the benefit of the early education, specifically for children at the risk of later schooling failure as well as development of children's cognition.

According to Nirmala et al. (2014), children' development cognitively could be indicated by the standardized mental capability and growth that help children to develop reasoning skills and standard level of problem solving and language development associated with the aspect related to brain development. However, children could be evaluated to indicate their level of intelligence by doing Intelligent Quotient (IQ) tests. Nirmala et al. (2014) added that the children' working brain, might be indicated to be a dynamic change and development to capture the new environmental situation that could shape and reform an individual. Shonkoff et al. (2009), concluded that, there should be a stronger emphasis on addressing the roots of disparities in early childhood.

Tassew (2012) revealed that preschool education in Ethiopia, can bring a strong effect that comes up on children' welfare and cognitive ways of development in social environment. Winhal *et al.* (2006) stated that tying the basic education of youth to each child could be the major aim based on Education For All (EFA). Therefore, the quality of ECE, strengthens young generation to get the basic skills related to their lives and promoting their school readiness to make effective baggage of primary education that might be rooted from achievement of nursery school (Carneiro, *et al.*, 2006).

In Rwanda, Early Childhood Development (ECD) policy indicates that each child should develop ECE through support given by parents, legal guardians and caregivers whose responsibilities of enhancing some benefits related to attending ECE leads to a good health care to children (MINEDUC, 2011). The ECE in Rwanda is participated by children aged from 3 to 6 years old. The participation in quality of pre-primary programs increases the likelihood of primary school attendance as well as decreasing repetition level and dropping out (REB, 2011). Good quality of ECE enhances children' school readiness which leads to better primary school outcomes. However, children of lower primary school, experience the lower level of cognitive development in Rwanda.

1.2 Problem Statement

The development of early childhood education policy in Rwanda, supports children to get equal opportunity of satisfying their potential due to parental support and strengthening their rights by government from one generation to another. Therefore, participation of children in Early Childhood education (ECE), indicates a dynamic cognitive development of children in the next level of education (MINEDUC, 2011). The standard level of education in pre-school help children to promote the ways of information process, language development as well as child intelligence level (MINEDUC, 2016). In spite of greater importance related to joining ECE, very little effort is being made to uphold this. UNESCO (2016), indicated that the effectiveness of ECE has reduced and may affect the level of cognitive development to children in primary schools. On another hand, Gracia *et al.* (2018), revealed that the registration of children in ECE in rural areas is lower than children enrolling in primary schools in Rwanda. This also indicates that, some children located in rural areas in Rwanda, do not attend ECE which may lead to lower poor cognitive development. Therefore, ECE in rural areas, is minimally established so as to enhance effective cognitive development of children in lower primary schools. MINEDUC (2016), indicated that children who don't participate in ECE, meet some challenges in lower primary school which include cognitive development. Lower primary school teachers and school head teachers are complaining a low capacity of pupils' cognitive development due to the low background of ECE. This paper therefore, sought to determine the effect of ECE on cognitive development of lower primary education in Kamonyi district.

1.3 Objective of the study

The objective of this paper was to establish the effect of early childhood education on cognitive development of pupils in lower primary education in Kamonyi district.

2.1 LITERATURE REVIEW

2.1.1 Overview of Early Childhood Education

According to Mbugua (2012), education in early childhood is considered to be the primary focus in establishment of children's development through conducive learning that leads to standard level of competition of children in primary school. ACEIO (2009) indicated that ECE, should be reinforced however, some circumstances may come and discourage effective implementation which tends to be the challenges to households in various countries. Driscoll and Nagel (2014) revealed that the societal change due to industrialization in some countries, increase the rate of people mostly females who do not enjoy rights especially, right to education and affect the early

years of learning to such young children. Despite, families of two working parents, extended that family support system to early childhood education (Gargiulo & Sluder, 2006).

According to Mbugua (2012), the standard of early childhood education, should be promoted by school leaders with effective teamwork among school members and external agencies and teachers who could regularly get professional skills that promote the school outcomes. Wortham (2010), also indicated that the developed countries, indicate education development to ECE to be started by children aged from birth to 8years old and those children who are in countries still being developed, the early childhood education is established from the birth period to age 6. According to United Nations Children's Fund (UNICEF, 2012), the determination of age period of attending ECE, reflects to the respective nations as well as societies that may be based on the philosophical beliefs related to the children' needs to get interest of early childhood education. According to Graves et al. (2006), the majority of young children can be indicated to be the roots of new generation which always needs to be maintained and protected so as to promote the future generations ready to develop their nations as well as society in general. Therefore, the young generations, should be strengthened so as to increase their competition level at the labor market with those who are at the same ages. Essa (2009), also revealed that ECE is the baseline that indicate the individual performance within daily lives.

The development of economy and education to a nation, are significantly associated with the level of educational development based on expertise of teachers and the quality of ECCE (Jaycox, 2012). According to Gonzalez-Mena (2010), the development of individual cognition promotes the social benefits and innovations to society as well as competition level and the quality of education. Therefore, any effort made to the establishment of early childhood education, is significance to the development of basic skills and education as well as better future life to young children.

2.1.2 Influential People in Early Childhood Education

This is significance to identify and understand the thoughts and theories considered as knowledge that help to indicate the development of ECE and practice to temporary practice (David, 2016). Therefore, this also provides a better understanding of how to make effective implementation related to teaching strategies. Piaget established the cognitive development of an individual and viewed that, the growth and development of cognition that reflect to how living things function psychologically. They make organization environment and adaptation based to the needs of society (Essa, 2009). The individual cognitive adaptation comes whenever new information or experience comforts a child. Such cognitive adaptation also occurs via twin process such as assimilation and accommodation. Assimilation occurs at the period of work, where a child gets to discover information so as to meet the needs of society. On another hand, this indicates some modifications of a new concept. Assimilation also indicates the individual growth and quantitative change in cognition while accommodation brings about the individual variations qualitatively.

According to Morrison (2007), the children's poor development was noted by Montessori as established teaching method with normal children as interested in children's great capacity in their first few years to learn a lot. Montessori argued that effective learning should be served to children who need always to be developed. Therefore, it was also established that ECE is one of the ways to overcome the issues related to children' school outcomes.

Jean-Jacques Rousseau (1712-1778) was a French philosopher and revealed that, things in every current environment which were natural and primitive, were intrinsically good. However, Rousseau also indicated that helping children to grow without the influence of civilization that enhances their moral potential (Morrison, 2007). Rousseau concluded that, children can learn and think in the ways that are fundamentally different from those of adults. Referring to Rousseau, the ideal education was based on pupil's education level. Basing on this study, children' education level rooted from ECE needs to be strengthened in order to enhance pupils' cognitive development.

Pestalozzi stated that education delivered to children, might be based on the needs of society though proposed that, individual difference should be taken into account among children. According to Essa (2009), effective learning of children should be indicated as an experience. Pestalozzi also added that, learner centered is considered to be a quality of ECE. Skinner indicated that children's education and development as being shaped by external rather than internal forces come from environment. Driscoll and Nagel (2014), indicated that this can be used as a theory related to behavior modification done by manipulating various aspects within environment which comprises all factors of individual life. Despite, the children' behavior can be developed by experience within performed activities and motivation. This implies that the children external environment should be managed effectively so as to adopt positive behavior.

2.1.3 Overview of Cognitive Development

According to Soman (2018), cognitive development of children can be referred to the construction of thought processes which include remembering, problem solving and children's language progressiveness and also decision making from childhood periods up to adult. According to David (2016), the development of children cognitively, plays a greater participation and influence to student school performance. Santrock (2011), revealed that the life of children, is also experienced by the massive cognitive growth that help a child to get the capacity related to making complex mental tasks.

The intellectual growth of an individual develops as the development of individual maturity strengthened by the social interaction (David, 2016). Therefore, the children's mind growth is associated the development of an individual basic memory process which encloses various daily activities done and experience gained. According to Santrock (2011), children accumulate knowledge and skills through processing various individual perceptions and beliefs that help to build the common understanding related to the needs of societal norms. Children ready to enroll in education provided by lower primary school, experience more the techniques that can be used to gain and construct the new concept and knowledge.

According to Daly and Taylor (2006), children in lower primary education, start improving their level of information processing, language development as well as their capacity of reasoning. The cognitive development of children in lower primary education, also experience, enhances the children's learning capabilities which lead to effective children' school completion (Dinga, 2011). According to Denboba and Wodon (2015), children at the age of lower primary school, their brain has grown at the level of 90 percent of its adult size and such increasing of brain maturation, indicates, high contribution to the improved cognitive abilities. This indicates that children might be equipped effectively in the early ages so as to get adequate background.

2.1.4 Early Childhood Education Curriculum Model in Rwanda

Diane (2004), indicated that each kind of learning, should be developed with specific type of curriculum conducted with the basis of societal norms and beliefs. According to Bauman (2012), the curriculum model in the early childhood can be established as a structured content to should be developed and meet educational policies and needs of society.

A valid curriculum model provides the theoretical framework, indicate the program of ECE that should be presented and also provide opportunities to be ready to learn in effective and strategic way (Fred, 2011). Educators of early childhood education might present the professional guidance to young children who want to develop their skills as well as local community provides its participation to children's experience (Bauman, 2012). According to Dodge (2010) creative curriculum used in early childhood, might indicate various ways that could be used by educators in that education. This also helps schools to develop the children' education effectively by providing the professional training to teachers (Dodge, 2010). This make active learning to children toward to social competence.

According to Doty (2010), the implementation of early childhood education curriculum, teachers try to organize what could be taught due to the interest of students. However, teachers should experience the implementation of curriculum through self-instruction and training. Fred (2011), also added that, adults should provide their participation in delivering education to youths so as to meet the needs of society and having a high level of competition at the labor market through effective performance of daily activities.

According to Diane (2004), all educational platforms should establish the relevance trainings and other motivating factors related to education. Despite, such program and other educational platforms, provide some orientation related to curriculum implementation to teachers through training (Diane, 2004). Workshops, monthly staff meeting and study group on curriculum related to topic to be learnt, enhance the promotion of teaching load and school productivity. This also shows that commitment and collaboration of teaching staffs promote the effectiveness.

2.1.5 Challenges Faced by Early Childhood Implementation

According to Manoj (2011), in spite of the high value of ECE to children' development cognitively, some obstacles and various issues that can discourage such development which can also affect effective intellectual capacity of a child. Though, the high limitation related to Early Childhood Education (ECE) implementation, can be identified in this study due to the human resource capacity (Violet, 2017). However, the resources related to monitoring and evaluation of ECE can also be indicated as a limitation towards to achievement of planned policy in education.

According to Vargas-Baron (2013), the financial support is considered to be the central factors for any running program to assume its shape. Though, the early childhood development, should be development due to the expansion of its services so as to ensure that such services are sustainable and are having a high quality and cost effective. Manoj (2011), revealed that early childhood education funding in East Africa in including Rwanda, used to train ECE teachers and parents are the main sponsors that should experience the program running of the early childhood education activities. Manoj (2011), also added that ECE funding is a burden to parents as they are supposed to incur the school fees of their children as well as other performance of ECE activities. Kibera

and Kamotte (2013), indicated that, the provision of incentives to teachers in early childhood education, as they are also considered to be the challenges of early childhood implementation.

Similarly, Leslie (2014), established that, the poverty and even the negativity of attitude related to the programs of early childhood education, the majority of parents do not finance the ECE services and can also affect their children to have the standard access to the quality of education. The high costs of ECE and primary education create a burden to households whose learners supposed to such education though, they are public schools (Leslie, 2014). Therefore, parents that cannot afford the amount required in ECE, do not get aware of enrolling their children to schooling which can also create a high illiteracy level in the community. Teachers of early childhood education in Africa, meet a high challenge in their teaching career which discourage effective development of children' educational standards (Udofot, 2013). The lack of teacher motivation, affect the teacher welfare and empowerment as become the challenges of ECE implementation.

Makoti (2013), indicated that, improved school outcomes can be strengthened by the ways teachers are motivated and their teaching activities. According to Karanja and Gishinji (2011), the low and irregularity of remuneration given to ECE teachers can also reduce the morale of the teachers. Kibera and Kamote (2013), also stated that motivation and incentives given to teachers in monetary or non-monetary term can vary teachers working conditions and teaching career as they should be considered as an avenue that can also lead to challenge the implementation of ECE. Makoti (2013), therefore, perceived that the untrained ECE teachers, inadequate of ECE qualified teachers which lead to the lack of teacher capacity and low ECE teachers' pay can also affect ECE policy implementation.

2.1.6 Early Childhood Education and Cognitive Development

According to Cunha et al. (2006), children's first period, experience various issues in terms of knowledge acquisition that develops the baseline of individual learning capabilities and social competition. Carneiro and Heckman (2013), also revealed that, the early childhood education (ECE), indicates the individual changes based on knowledge and skills development that could someone to be adapted in society. UNESCO (2010), also added that, in the period of ECE, experience a high rate of human intellectual development that varies with a short time as also based on the norms of society and individual willingness.

The cognitive variation of children in lower primary school, which is rooted from ECE, indicates a level of a children' intellectual growth and academic motivation that lead to effective school completion and children' competition in other levels of education (Heckman, 2009). The human skill formation which enhances the cognitive development, is also considered as a multiple stage process, mostly experienced in the period of ECE or school period and also after school as well as during job training (Cunha et al.,2006). The developed multiple skills which include both cognitive and non-cognitive, are more sensitive and critical in terms of personal investment where inadequate ECE requirements are very expensive to some parents (Tassew, 2012). This also implies that education investment is more significant to children' growth and development as they accommodate a child to be settled in school and acquires the related education effectively.

According to Shonkoff (2009), the investments established to provide ECE, could be relatively correlated with the quality of education provided by a relevance learning institution. Helmers and Patnam (2009), indicated that children meet various challenges in lower primary school based on

their level of cognition due to the fact that some do not attend ECE. Therefore, a child who attends ECE develop a significant background that support to perform effectively in other school levels (Shonkoff, 2009). According to Nirmala (2014), a skilled attendant in ECE in developed countries, is present only 3 out of 5births due to the lower level of rural children and the poorest children. Cunha et al. (2006), also added that, mother's educational level and household's socio-economic status significantly influence children early learning and school readiness which lead to human cognitive development.

2.1.7 Effect of Early Childhood Education on Cognitive Development

The ECE can be affected by various factors including school and parental factors that result to effective cognitive development of children especially those who are still young including pupils' motivation and self-discipline as well as pupil' socialization (Cunha et al., 2006). According to Helmers and Patnam (2009), the cognitive and non-cognitive skills, indicate some interaction and reinforcement to each pupil. Despite, such interaction and reinforcement of every pupil, are characterized by self and cross productivity. The development of children' education can be associated with the effectiveness read to promote the development of children' education (Connelly, 2008). The intervention that may lead to the improvement of the children's early education (UNESCO, 2010). However, the cognitive abilities can also be measured abilities indicated by an individual at the labor market (Connelly, 2008).

According to Tassew (2012), the effects of children that begin their education later in their ages and automatically enroll in primary schools, they may jump the nursery and kindergarten which can result to experiencing high repetition rates as well as dropout rates and also overpopulation in classroom setting. Therefore, levels indicated by children in terms of cognitive within education provided in pre-school, also indicate lower capacity of school achievement in primary schools (Macours, et al., 2008). In short, the lower level of early childhood development, leads to the lower eve of cognitive development and reduces the school performance in lower primary education, which also indicates that the development of individual skills may affect the future human capacity. Therefore, the lower levels of cognitive development are experienced by inadequate establishment of ECE (Grantham-McGregor et al., 2007). Though, can be tied to poor school performance.

Goodman et al. (2005), revealed that, taking a child schooling before age of 5, present some effects on cognitive and socialization in their lives. Therefore, the ECE can also determine the effectiveness of school performance and future life. Despite, it was also realized that, the performance of school tests done at age7, remain valuable till the ages of secondary schools (Tassew, 2012). However, children' social skills as a non-cognitive development, indicated as the mixture of various behavior and attitudes that could be managed by the households involvement. Susanna (2005), also added that, children who attend early childhood education, experience a high level of cognitive outcomes in primary school like reading, counting and language development as well as being superior in social and behavioral skills than their peers without early childhood education.

3.1 RESEARCH METHODOLOGY

This paper employed correlation research design. The target population was 260 people comprising 30 head teachers and 230 teachers. The sample size was 158 respondents got by using

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solvin's formula such as 140 teachers and 18 school head teachers but only 122 teachers and 18school head teachers returned the data collection instrument. The sample was obtained by employing stratified sampling technique. The research instruments used were questionnaires and interview guides.

4.1 RESEARCH FINDINGS

This study sought to investigate the effect of early childhood education on cognitive development of pupils in lower primary education in Kamonyi district.

4.1.1 Early Childhood Education in Kamonyi district

The findings of teachers' responses on early childhood education in kamonyi district are depicted in Table 1

Table 1: Teachers' responses on early childhood education in Kamonyi district

Statements	SD		D		U		A		SA		Mean	Std
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%		
School physical environment supports ECE	36	29.5	40	32.8	9	7.4	21	17.2	16	13.1	2.70	1.40
Having maintained learning environment	26	21.3	48	39.3	16	13.1	24	19.7	8	6.6	2.83	1.41
Collaboration between parents and schools	24	19.7	47	38.5	21	17.2	14	11.5	16	13.1	2.81	1.33
Parents make follow up of their children at school	31	25.4	41	33.6	16	13.1	20	16.4	14	11.5	2.75	1.35
Effective commination between Teachers and parents	40	32.8	30	24.6	19	15.6	11	9.0	22	18.0	2.73	1.46
Standard of teachers-pupils interactions	33	27.0	44	36.1	18	14.8	10	8.2	17	13.9	2.70	1.41
Enhanced children social adaptation	26	21.3	45	36.9	16	13.1	17	13.9	18	14.8	2.81	1.34
ECE accessibility	26	21.3	37	30.3	26	21.3	16	13.1	17	13.9	2.85	1.31
Affordable schools of ECE	27	22.1	44	36.1	16	13.1	10	8.2	25	20.5	2.65	1.62
Availability of ECE schools	32	26.2	38	31.1	18	14.8	22	18.0	12	9.8	2.68	1.64

Based on the results presented in Table 1, it was found that the majority of respondents agreed on affordability of ECE schools in Kamonyi district as was presented by the mean of 2.65 and the standard deviation of 1.62 and also agreed by 28.7% of teachers. This implies that early childhood education is affordable in Kamonyi district though it was still at the lower level. However, the mean of 2.83 and standard deviation of 1.41 that there was maintained learning environment as also agreed by 26.3% of teachers. This was followed by 27.0% of teachers agreed on accessibility of early childhood education in Kamonyi as presented by the mean of 2.81 and 1.34 of standard deviation. Essa (2009), also revealed that the accessibility and affordability of ECE schools are considered as the baseline that indicate the individual performance within daily lives.

On the other hand, only 27.9% of teachers agreed that parents make follow up their children as also perceived confirmed at the mean of 2.81 and the standard deviation of 1.33. This shows that the majority of parents do not make follow up of their children's education which can also reduce their level of cognitive development. This was followed by 27.0% of teachers agreed that there is effective communication between teachers and parents as presented by the mean of 2.75 and the standard deviation of 1.35 which indicates that there is effective involvement of parents in education. However, 22.1% of teachers agreed that there were some standard teachers-pupils interaction as presented by the mean of 2.73 and the standard deviation of 1.46. This also implies that pupils in lower primary education in Kamonyi district don't effectively get aware of interacting with their teachers which can affect their learning condition and performance. According to Morrison (2007), the children's poor development was noted by Montessori as established teaching method with normal children as interested in children's great capacity in their first few years to learn a lot.

The findings in the Table 1 revealed that 28.7% of teachers agreed that there were enhanced children social adaptation as also agreed at the mean of 2.70 and the standard deviation of 1.41 while 30.3% of teachers with the mean of 2.70 and 1.40 of standard deviation agreed that there was school physical environment that support early childhood education. According to Mbugua (2012), education in early childhood is considered to be the primary focus in establishment of children's development through conducive learning environment that leads to standard level of competition of children in primary school. However, 27.8% of teachers with mean 2.68 and standard deviation of 1.64 agreed on the availability of early childhood education. This implies that ECE in Kamonyi district is not available effectively that can also reduce the cognitive development of children in lower primary education.

The school head teachers in guided interview also indicated that effective early childhood education should be improved due to effective parental involvement, interaction between teachers and pupils and adequate physical and social learning environment. However, they also indicated that in Kamonyi district the ECE is not effectively accessible and affordable due to the fact that inadequate ECE infrastructures, communication between parents and teachers and distance from home to school. Saul (2018) stated that in the rural areas, the quality and affordability of early childhood education are not widely available.

4.1.2 Cognitive Development of Pupils in Lower Primary Education in Kamonyi District

The outcome of the teachers' responses on cognitive development of pupils in lower primary education is shown in Table 2

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Table 2: Teachers' responses on cognitive development of pupils in lower primary education

Statements	SD		D		U		A		SA		Mean	Std
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%		
Opportunity related to language development	33	27	34	27.9	16	13.1	19	15.6	20	16.4	2.46	1.55
Aware of information processing in classroom	29	23.8	48	39.3	16	13.1	16	13.1	13	10.7	2.34	1.75
Standard level of reasoning	29	23.8	31	25.4	26	21.3	16	13.1	20	16.4	2.79	1.36
Children communicate fluently	34	27.9	32	26.2	17	13.9	15	12.3	24	19.7	2.36	1.95

The research presentation in Table 2reveal that the majority of 29.5% of teachers with the mean of 2.79 and the standard deviation of 1.36 agreed that there is a standard level of reasoning in lower primary education in Kamonyi district. This implies that the majority of teachers revealed that there was no standard level of reasoning to children in lower primary education which affect negatively their cognitive development. On the other hand, the Table 2 also reveals 32.0% of teachers with the mean of 2.46 and the standard deviation of 1.55 agreed that pupils of lower primary education in Kamonyi district have opportunity related to language development as indicated to be at the lower level. According to Soman (2018), cognitive development of children can be referred to the construction of thought processes which include remembering, problem solving and children's language progressiveness and also decision making from childhood periods up to adult.

The findings in the Table 2 also state that 32.0% of teachers and the mean of 2.36 and the standard deviation of 1.95 agreed that children in lower primary education in Kamonyi district that they communicate fluently which is still low and affect the effective cognitive development of children. However, only 23.8% of teachers with the mean of 2.34 and standard deviation of 1.75 agreed that children in lower primary education are aware of information processing in classroom. This implies that level of children's information process is very low as is supposed to be used to develop the children's cognition in lower primary schools. According to Daly and Taylor (2006), children in lower primary education, start improving their level of information processing basing their background got from pre-school.

The school head teachers in guided interview also added that cognitive development of pupils in lower primary school can be determined by effective language development to pupils and standard level of information processing as well as reasoning. Despite, they indicated that such aspects that lead to effective cognitive development in Kamonyi district are emphasized according due to the fact that pupils in lower primary education, the majority indicate poor educational background related to early childhood education. Though, some pupils do not even enroll pre-primary school

before enrolling primary school and miss some basic skills that may lead them to having effective cognitive development. According to Nirmala et al. (2014),the children' development cognitively, could be indicated by the standardized mental capability and growth that help children to develop reasoning skills and well as having the standard level of problem solving and language development associated with the aspect related to brain development.

4.1.3 Effect of Early childhood education on cognitive development pupils in lower primary education

The model summary of parental involvement and cognitive development of pupils in illustrated in Table 3 below

Table 3: Model summary of parental involvement and cognitive development of pupils

					Change Statistics				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	.515[a]	.265	.260	.92445	.265	49.712	1	138	.000

a. Predictors: (Constant), Parental involvement

The results shown in Table 3 illustrates that the R Square was .265. This implied that parental involvement is able to affect 26.5% variations in the children's cognitive development in lower primary education. This also indicated that the remaining 73.5% of children's cognitive development can be affected by other variables. The results are in agreement with the findings of Helmers and Patnam (2009) who indicated that children meet various challenges in lower primary school based on their level of cognition due to the fact that their parents are not effectively involved in education of their children.

4.1.4 Relationship between Teacher-pupils interaction and children's language development

The correlation of parental involvement and children cognitive development is depicted in Table 4

Table 4: Correlation of parental involvement and children cognitive development

Correlations

		Parental involvement	children cognitive development
Parental involvement	Pearson Correlation	1.000	.515**
	Sig. (2-tailed)		.000
	N	122	122
children cognitive development	Pearson Correlation	.515**	1.000
	Sig. (2-tailed)	.000	
	N	122	122

**. Correlation is significant at the 0.01 level (2-tailed).

The Findings from the Table 4 indicates that there is a statistical significance relationship between parental involvement and children cognitive development thus P-value = .000 which less than 0.01 as the level of significance and Pearson coefficient of correlation r = .515. This also implies that there is an association on the effect of parental involvement on children cognitive development.

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According to Shonkoff (2009), the investments established to provide ECE, and involvement of parents to education could be relatively correlated with the quality of education provided by a relevance learning institution.

Children cognitive development by teachers' working experience

This study also performed comparative analysis related to the extent to which teachers' working experience can affect the cognitive development of pupils in lower primary education and the findings are presented in the Table 5.

Table 5: Children cognitive development by teachers working experience

Working experience	Mean	Std. Deviation
Below 3years	3.9474	1.17727
3-5years	4.3462	.86057
6years and above	4.0290	1.17537

From the Table 5 that presents how the pupils' cognitive development can be enhanced due to the working experience of teachers in lower primary education. The findings indicate that teachers whose the working experience of 3 to 5years present a high mean of 4.35 and the standard deviation of .86 to improve the cognitive development if children followed by teachers whose working experience of 6years and above as the mean = 4.03 and the standard deviation= 1.17. Finally, teachers whose working experience below 3years are able to enhance the cognitive development of pupils in lower primary education at the mean of 3.95 and 1.17. This implies that teachers' working experience play significance in the promotion of cognitive development to pupils in lower primary education in Kamonyi district. According to Helmers and Patnam (2009), the cognitive and non-cognitive skills, indicate some interaction and reinforcement to each pupil due to the working experienced presented by their teachers responsible to make effective delivery of education.

The school head teachers also added that effective establishment of early childhood education in general strengthens the cognitive development of pupils in the next levels of education as their educational background. Though, the respondents added that poor implementation of early childhood education policy in Kamonyi district especially in rural areas affect negatively the level of cognitive development to pupils attending lower primary education due to the lack of basic skills that help them to have adaptation related to primary school activities. Tassew (2012), indicated that the majority of students whose better academic scores, were having high background got from ECE.

5.0 CONCLUSIONS

The objective of this paper was to investigate the effect of early childhood education on cognitive development of pupils in lower primary education in Kamonyi district in Rwanda. The results showed that parental involvement is able to affect is 26.5% of the variations in the cognitive development of pupils in lower primary education in Kamonyi district. The paper concluded that there is a statistical significance relationship between the variables of early childhood education and those of cognitive development of pupils in lower primary education. Therefore, every increase among variables of ECE in Kamonyi district may also increase the cognitive development of pupils in lower primary education.

6.0 RECOMMENDATIONS

Through the presented findings and drawn conclusion, the recommendations were also established. Through the research findings, the following recommendations were made;

1. Education policy planners should put much emphasis in planning policy that guides early childhood education in rural areas so as to standardize the background of children in pre-primary school.
2. The Ministry of Education should improve the financial supports that help to make the implementation of ECE effectively like school infrastructures and teachers incentives.
3. The school head teachers should make effective school management in order to improve the cognitive development of pupils attending schools.
4. Teachers should improve their teaching approached that make conducive learning environment in order to improve the pupils' intellectual capacity.
5. Parents should be encouraged to enroll their children in early childhood education in order to help their children to have basic skills that strengthen their educational background.

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