

ICT KNOWLEDGE AS CORRELATE OF COGNITIVE DEVELOPMENT OF PRIMARY SCHOOL PUPILS IN IMO STATE

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Abstract

The study examined ICT knowledge as correlate of cognitive development of primary school pupils in Imo State. Two research questions and two hypotheses guided the study. Correlation research design was adopted for the study. The population of the study was all the pupils in the 1,280 public primary schools in the 27 Local Government Areas in Imo State. A sample of 358 Primary 6 pupils was involved in the study. Proportionate stratified random sampling technique was used for the study. The instruments adopted for this study are: ICT Knowledge Rating Scale (ICTKRS) and Cognitive Development Rating Scale (CDRS). The ICTKRS has 10 items and was used to measure the ICT knowledge/ability/familiarity of the pupils. The CDRS has 20 items and was used to measure cognitive development of the pupils in five point scale. Face and content validity of the instruments were ascertained by specialists in Educational Psychology and Measurement and Evaluation, and their reliabilities were computed using Cronbach alpha which gave indices of 0.81 and 0.85 for ICTKRS and CDRS respectively. The data collected were analyzed using Pearson r to answer the research questions, while t -test of simple correlation was used to test the hypotheses at 0.05 level of significance. It was found among others that there is a moderate positive and significant relationship between ICT knowledge and intellectual abilities of primary school pupils in Imo State. It was also found that there is a high positive relationship between ICT knowledge and perceptual abilities of primary school pupils in Imo State. It was recommended among others that ICT enabling gadgets should be provided to primary schools by the government to aid the pupils in intellectual abilities.

Introduction

Primary education is a vital component of the education system and should be attended by all citizens in a country. According Sen (2010) Primary education is the foundation for a child's learning on which every other level of learning depends. Researchers believe that achieving these functions requires language development, memory development, concept formation, perception

and intelligence (Obiweluzo, 2016; Ukwueze & Ajala, 2014), and the use of innovative pedagogies. Pupils should be guided properly at this level to achieve the above stated objectives. Primary education is the bedrock of the whole educational process by its function of providing literacy, numeracy and ability to communicate.

Children solely depend on the parents and caregivers for survival. It follows therefore that whatever children experience between birth and puberty contribute to the personality of the individual. Obiweluzo (2016), asserts that this stage in life, children are characteristically intellectual, curious, inquisitive and physically active in nature. During this phase, basic literacy as well as computational and conceptual skills is acquired. At this stage, children develop the ability to use images, symbols, concepts, rules and vocabulary. Also, at this stage, teachers are expected to give maximum support in the socialization of young children for proper acquisition of required skills.

One of the key pedagogical reforms for effective teaching and learning to achieve literacy, numeracy and communication in the 21st century is the introduction of Information and Communication Technology (ICT). Information and communications technology is an umbrella term that includes any communication device or application, encompassing: radio, television, cellular phones, computer and network hardware and software, satellite systems as well as the various services and applications. Information and communication technology is concerned with various means of gathering, processing and transferring information using computers and telecommunication. Information and Communication Technology records, stores, processes, retrieves, transfers, and receives information. ICT can also be defined as passing of information from one person to another using electronic device. Ukwueze and Ajala (2014) sees it as anything which gives access to information, to communicate with each other, or to have an effect on the environment using electronic or digital equipment. Shelly (2013) also defined information and communication technologies as diverse set of technological tools and resources used to communicate, and to create, disseminate, store, and manage information.

The term ICT could include computer hardware and software, digital cameras and video cameras, the Internet, telecommunication tools, programmable toys, and many other devices and resources. Operationally therefore, ICT is a collection of computer-based technologies which are exploited in schools to support teaching and learning, communication and collaboration, self-expression and creativity for the promotion of cognitive developmental domain of learners, irrespective of the age. ICT involves sharing of ideas, facts, thought, knowledge, experiences, or attitude that

produces a degree of understanding between a sender and receiver. Researchers, educational administrators, policy makers and planners believe that ICTs are one of the basic building blocks of modern society (Anderson, 2010; Afolabi & Abidoye, 2012). Consequently, ICT policies are formalized as part of major educational reform where human development takes place.

Development is the change that occurs in the life of an individual. According to Olowe and Kutelu (2014), development is a progressive series of changes that occur in an orderly and predictable pattern as a result of maturation and experience. Mangall (2007) described development as a process of change in growth and capability over time as function of both maturation and interaction with the environment. The foregoing suggests that development of an individual includes growth, capability, maturation and interaction with the environment. Development is concerned with total biological process taking place in the individual.

Cognitive development implies progressive changes in mental process which goes on from birth to death. The mental processes are series of psychological activities in an individual cognitive structure. Cognitive development includes various aspects of developments such as development of concepts, perception, language, memory, reasoning, thinking, imagination and intelligence. Olowe and Kutelu (2014) have identified five aspects of cognitive development. The aspects include intelligence, sensation and perception, concept formation, development of language and development of memory. According to Okoro and Ekpo (2016), cognitive development implies increase in intelligence. The result of Mangal (2007) intelligence test shows that cognitive development or intellectual growth is rapid in infancy, moderate in childhood and slow in youth. Also, both sensation and perception are considered important aspects of cognitive development. Another aspect of the child's cognitive development is the acquisition of concept. Concept is the generalized meaning that is attached to an object or idea. It is the result of one's perception and experience. It involves both discrimination and generalisation. Experience is an important factor in concept formation (Okam, 2012). Normally, concept formation proceed from concrete to abstract, vague to clear and from inexact to exact, depending on the type of experiences a child receives. The development of language contributes to the mental growth and development of the child. Important aspects of language development are speech, vocabulary and length of responses. Memory is also an important element of cognitive development, there is little memory at birth but it gradually increases with maturation and experience (Okam, 2012).

The study by Ukwueze and Ajala (2014) showed that the use of a broad range of modern ICT materials enhances children's belief in their own

competency, thus, supporting effective learning. Okoro and Ekpo (2016) reported that ICT package like Projected Video Package (PVP) significantly improved students' cognitive development in schools. Olowe and Kutelu (2014) revealed that using ICT can help to facilitate children's cognitive, physical and social-emotional development, and as well sustain children's interest in learning. Okoro and Ekpo (2016) indicated that ICT in fact promotes children in various ways.

Over the past three decades, education administrators, policy makers and planners have made considerable investment in computer based information and communication (ICT) to support effective development of the child through learning. Many national and international organizations like UNESCO, WHO in the world endorsed these initiatives. Yet, result on influence of ICT on literacy, numeracy and communication of many primary school pupils in Imo State has been below average. The personal experience of the researcher shows that there is poor cognitive development of children in the aspect of intelligence, perception, concept formation and second language development. This poor cognitive development could be associated with lack of exposure to some trends in educational system like under utilization of ICT facilities and lack of the facilities. This study posed as a question is: what is the relationship between ICT knowledge and cognitive development of primary school pupils in Imo State? The answer to this question is the crux of the study.

The main purpose of this study is to investigate ICT knowledge as correlate of cognitive development of primary school pupils in Imo State. Specifically, the study seeks to ascertain:

1. the relationship between ICT knowledge and intellectual abilities of primary school pupils in Imo State; and
2. the relationship between ICT knowledge and perceptual abilities of primary school pupils in Imo State;

The following research questions guided the study

1. What is the relationship between ICT knowledge and intellectual abilities of primary school pupils in Imo State?
2. What is the relationship between ICT knowledge and perceptual abilities of primary school pupils in Imo State?

The following null hypotheses are postulated to guide the study:

H₀₁: The relationship between ICT knowledge and intellectual abilities of primary school pupils in Imo State is not significant.

H₀₂: The relationship between ICT knowledge and perceptual abilities of primary school pupils in Imo State is not significant.

Method

Correlation research design was adopted for the study. The population of the study was all the pupils in the 1,280 public primary schools in the 27 Local Government Areas in Imo State. A sample of 358 Primary 6 pupils was involved in the study. Proportionate stratified random sampling technique was used for the study. The instruments adopted for this study are: ICT Knowledge Rating Scale (ICTKRS) and Cognitive Development Rating Scale (CDRS). The ICTKRS has 10 items and was used to measure the ICT knowledge/ability/familiarity of the pupils. The CDRS has 20 items and was used to measure cognitive development of the pupils in five point scale. Face and content validity of the instruments were ascertained by specialists in Educational Psychology and Measurement and Evaluation, and their reliabilities were computed using Cronbach alpha which gave indices of 0.81 and 0.85 for ICTKRS and CDRS respectively. The data collected were analyzed using Pearson *r* to answer the research questions, while *t*-test of simple correlation was used to test the hypotheses at 0.05 level of significance.

Results

Research Question 1

RQ₁: What is the relationship between ICT knowledge and intellectual abilities of primary school pupils in Imo State?

Table 1: Pearson Product Moment Correlation Analysis of the relationship between ICT knowledge and intellectual abilities of primary school pupils in Imo State

V	n	Σ	SS	SP	S ²	Cov.	r	Remarks
X	358	10330	7126.447		19.962			Moderate Positive Relationship
Y	358	11309	5512.640	3226.648	15.442	9.038	0.52	

Magnitude of Relationship = Moderate

Direction of Relationship = Positive

Percentage Coefficient of Determination = 27.04%

Results in Table 1 show the magnitude and direction of the relationship between ICT knowledge and intellectual abilities of primary school pupils in Imo State. Through the sum of squares and sum of products values, or true the variance and covariance values, a coefficient of 0.52 is realized. The

coefficient indicates that there is a moderate positive relationship between ICT knowledge and intellectual abilities of primary school pupils in Imo State. The percentage coefficient of determination indicates that 27.04% of the variations in intellectual abilities of primary school pupils could be attributed to their ICT knowledge.

Hypothesis 1

Ho₁: The relationship between ICT knowledge and intellectual abilities of primary school pupils in Imo State is not significant.

Table 2: t-test of significance of the relationship between ICT knowledge and intellectual abilities of primary school pupils in Imo State

V	n	Σ	r	α	df	t _{cal}	t _{tab}	Decision
X	358	10330	0.52	0.05	356	11.330	1.96	Fail to Accept Ho₁
Y	358	11309						

Results in Table 2 show the test of relationship between ICT knowledge and intellectual abilities of primary school pupils in Imo State. The degree of freedom is 356 and the t-calculated value of 11.330 is greater than the t-tabulated value of 1.96. Since the t-calculated value is greater than the t-tabulated value, the null hypothesis is rejected; thus concluding that there is significant relationship between ICT knowledge and intellectual abilities of primary school pupils in Imo State.

Research Question 2

RQ₂: What is the relationship between ICT knowledge and perceptual abilities of primary school pupils in Imo State?

Table 3: Pearson Product Moment Correlation Analysis of the relationship between ICT knowledge and perceptual abilities of primary school pupils in Imo State

V	n	Σ	SS	SP	S ²	Cov.	r	Remarks
X	358	10330	7126.447		19.962			High Positive Relationship
Y	358	10883	7715.880	4952.771	21.613	13.873	0.67	

Magnitude of Relationship = High
 Direction of Relationship = Positive
 Percentage Coefficient of Determination = 44.89%

Results in Table 3 show the magnitude and direction of the relationship between ICT knowledge and perceptual abilities of primary school pupils in Imo State. Through the sum of squares and sum of products values, or true the variance and covariance values, a coefficient of 0.67 is realized. The coefficient indicates that there is a high positive relationship between ICT knowledge and perceptual abilities of primary school pupils in Imo State. The percentage coefficient of determination indicates that 44.89% of the variations in teachers' effectiveness in teaching skills could be attributed to their exposure to capacity building programmes.

Hypothesis 2

Ho₂: The relationship between ICT knowledge and perceptual abilities of primary school pupils in Imo State is not significant.

Table 4: t-test of significance of the relationship between ICT knowledge and perceptual abilities of primary school pupils in Imo State

V	n	Σ	r	α	df	t _{cal}	t _{tab}	Decision
X	358	10330	0.67	0.05	356	16.933	1.96	Fail to Accept Ho ₂
Y	358	10883						

Table 4 presented the test of the relationship between ICT knowledge and perceptual abilities of primary school pupils in Imo State. The degree of freedom is 356 and the t-calculated value of 16.933 is greater than the t-tabulated value of 1.96. Since the t-calculated value is greater than the t-tabulated value, the null hypothesis is rejected; thus concluding that there is significant relationship between ICT knowledge and perceptual abilities of primary school pupils in Imo State.

Discussion of Findings

It was revealed in this study that there is a moderate positive and significant relationship between ICT knowledge and intellectual abilities of primary school pupils in Imo State. This finding indicates that there is a moderate tendency for ICT knowledge to have influence on intellectual abilities of primary school pupils in Imo State. That is to say that having a high or low knowledge of ICT contributes significantly to intellectual abilities of children. This is true because as they use ICT, there is a high tendency that their intellects process the information they receive in the act of its usage, hence, enhancing their intellect. This finding is in agreement with that of Ukwueze and Ajala (2014) which showed that the use of a broad range of

modern ICT materials enhances children's belief in their own competency, thus, supporting effective learning. Okoro and Ekpo (2016) study indicated that ICT package like Projected Video Package (PVP) significantly improved students' cognitive development in schools.

It was also revealed in this study that there is a high positive relationship between ICT knowledge and perceptual abilities of primary school pupils in Imo State. This is an indication that ICT knowledge influences perceptual abilities of primary school pupils in Imo State. This could mean that as one engages in the use of relevant ICT facilities, his/her perceptual abilities begin to improve and then high perception sets in. This finding is in line with Olowe and Kutelu (2014) findings which revealed that, using ICT in preparation can help to facilitate children's cognitive, physical and social-emotional development, and as well sustain children's interest in learning. Okoro and Ekpo (2016) indicated that ICT in fact promotes children in various ways.

Conclusion

Based on the result of this study, the researcher concluded that ICT knowledge has much influence on intellectual abilities and perceptual abilities of primary school pupils in Imo State. Thus, they are concomitant variables.

Recommendations

Based on the result of this study, the researcher recommends that;

1. ICT enabling gadgets should be provided to primary schools by the government to aid the pupils in intellectual abilities.
2. ICT equipped language laboratories should also be established in primary schools by the government as it will help them to improve on their perceptual abilities.

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