

# INFLUENCE OF DIGITAL LEARNING ACCEPTABILITY ON EDUCATIONAL OUTCOMES AMONG PRIMARY SCHOOL PUPILS IN NAIROBI CITY COUNTY, KENYA

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**Abstract:** Digital involvement in provision of teaching and learning resources has been associated with positive achievements in educational outcomes. This study was carried out in public and private primary schools in Nairobi city. The study conducted a Cross-Sectional Survey on a defined population and employed Simple random sampling technique to select 39 schools. Proportionate random sampling was used to select 35 teachers and 150 class 7 pupils. The study used purposive sampling to select 15 head teachers who served as respondents. Primary data and secondary data were collected by the study. The study used structured and unstructured questionnaires to collect data from the respondents. Data collected was analyzed quantitatively and qualitatively. The study employed Statistical Package for Social Sciences (SPSS) version 21.0. as a tool for data analysis. Descriptive Statistics such as frequency distributions, percentages, means and standard deviations were used by the study during data analysis. Inferential statistics employed by the study included Pearson Correlation and regression analysis. Data was presented in the form of figures, tables, and charts. This study sought to determine the impact of digital learning acceptability on learners' educational outcomes. The study was conducted in primary schools in Nairobi City County. The study sought to establish how accessibility of ICT learning resources, integration of digital instructional tools, acceptability of ICT tools and methods and how usability of ICT tools influenced learners' educational outcomes. 185 respondents filled and returned the questionnaires. The study revealed that acceptability of ICT learning resources, integration of digital learning tools, acceptability of ICT methods & tools and usability of ICT tools significantly influenced learners' educational outcome. The study recommended that the government of Kenya and other policy makers in the education sector need to stipulate policies that can improve accessibility to ICT learning resources, integration of digital instructional tools, acceptability of ICT methods and tools and the usability of ICT tools in a bid to improve learners' educational outcomes. The study suggests that further studies should focus on determining the influence of other digital learning acceptability variables not captured in the study.

**Keywords:** Acceptability, Accessibility, Clarity, Digital Learning, Educational outcome, ICT Facilities, Integration, Skills, Usability.

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## I. INTRODUCTION

Globalization and diffusion of digital learning is taking place in all spheres of life and has created a social system that is driven by knowledge and powered technology (Mathipa & Mukhari,2014). Education systems are under increasing pressure to use ICT in teaching and learning. This pressure emanates from the explosion of knowledge and the need for

education to embrace e-learning as a way of promoting acquisition of ICT knowledge for lifelong learning. According to Ondiegi (2014), e-learning resources such as the internet and laptops can help improve learners' educational outcome though schools with digital learning resources have not optimized the use of ICT. The study explains that the barriers to ICT use are learner attitude, competence, usability, acceptability of the ICT tools. Other barriers to ICT use are integration and extra work load on the learners, lack of sufficient resources like internet, laptops or tablets and electricity. ICT replaced computers in the 1980s. This signified a sharp shift to the ability to store and retrieve information. The email provided a reliable way to disseminate information to the public. UNESCO (2013) describe e-learning as a range of technology used to collect, store, edit and transfer information to learners in various forms. Smith (2014) explained that e-learning enhanced communication, built human capabilities, enhanced freedom and offers learners' access to information. E-learning enhances research and problem-solving skills. Smith (2014) explains that digital learning is changing the education landscape resulting in dramatic increase in the learners' educational outcome. LeFevre (2014) explains that digital learning has addressed issues of quality and improvement on learning. Harrison *et al* (2010) revealed that higher levels of ICT use significantly influenced school achievement in English, Math, Science, Modern Foreign Languages and Design Technology. The study established that high ICT use influenced the performance of pupils in primary schools (Austin *et al.*, 2011). The study further revealed that more effective teachers (and more effective schools) employed more innovative approaches through enhanced ICT use. Anders *et al* (2012) established a link between high levels of ICT use and improved school performance through an ICT Test Bed evaluation. The study concluded that schools with higher than average levels of ICT provision had pupils performing slightly higher than average. The study explained that high performing schools were better equipped to adopt technology in a bid to bring about improvement. Buny (2015) analyzed the link between provision and performance based on the Programme for International Student Assessment (PISA). Buny (2015) demonstrated that the schools that invested more on ICT also were equipped with other positive characteristics. The study concluded that computer availability at schools was related to pupil performance in math and reading in controlled environments. Wamakote and Henessy (2010) opines that government ICT policies tend to address the creation, dissemination and sharing of digital learning resources, management and maintenance. The study informed that ICT use provide an effective tool to enhance teaching and learning processes in East Africa. ICT use in the Tanzanian education sector has equally been vibrant in recent years. MoEVT (2017) opine that the International Institute for Communication and Development (IICD) supported roundtable in Bagamoyo where 11 ICT projects for education were formulated to the Swedish International Development Agency (SIDA) in 2005. The discussions came up with Tanzania e-Schools initiative and other policy papers. MoEVT (2017) observes that most private schools in the urban centres have adopted ICTs. Parents have played a major role in this push to adopt ICT use for students to achieve high national grades though ICTs are mostly confined to administration. The eSchool Forum, programme proposal suggests a phased approach for ICT starting with 200 schools in phase one and a large-scale rollout of 2000 schools in phase two with a nationwide coverage. The eSchools programme proposal is currently under review by the MoEVT. MoEVT (2007) observes that only very few schools in Tanzania have access to ICT infrastructure mostly in urban centers. Tanzania has put much effort to develop infrastructure to facilitate the adoption of ICT within the education system such as access to computers and the Internet, digital equipment, telecommunications, radio and television.

Rwanda's Vision 2020 which was published in 2000, outlining an agenda to transform the country into a medium-level, knowledge-based economy by the year of 2020. Due to the lack of sea-access and few natural resources, it was acknowledged that ICT would have to play a central role in this transformation. The ICT policy objectives consider issues of infrastructure, curriculum and content, training and capacity development, planning procurement and administration, management, support and sustainability, and monitoring and evaluation (Orlich, 2014). The Vision 2020 plan declare ICT as crucial in two out of six main areas. In education, an increased use of computers in schools hope to improve ICT skills among the young. Based on such expectations, the Rwandan government has collaborated with the One Laptop per Child (OLPC) association, a non-profit US-based organization focused on the creation of educational tools for use in the developing world. The use of ICT offers powerful learning environments and can transform the learning and teaching process so that pupils can deal with knowledge in an active, self-directed and constructive way. The Kenya National ICT policy was adopted in 2006 after several years of effort in trying to put it in place. The policy sought to improve the livelihoods of Kenyans by ensuring the availability of accessible, efficient, reliable and affordable ICT services as reported in the ICT in Education options paper (MoEST,2014). Although the national ICT policy has several sections,

objectives and strategies regarding ICT in education are spelt out in the information technology section. The objective regarding the use of ICT in schools, colleges, universities and other educational institutions to improve the quality of teaching and learning is spelt out as documented by Orlich in the Survey of ICT in Africa Report (Orlich, 2014). One important strategy outlined in this report is the promotion and development of specific e-learning resources that would address the educational needs of primary, secondary and tertiary institutions. A significant step in this direction is the digitisation of the curriculum which is ongoing at the Kenya Institute of Education (Githogo, 2012).

The Kenyan government has facilitated e-learning by development of the Kenya Education Sector Support Programme (KESSP, 2014). In the Kenya ICT policy document 2014 the government states that it will encourage the use of ICT in schools to improve the quality of education. KICD launch of the digital learning Committee that would be in charge of supervising the digital process within a specified time period and using a suitable switchover policy fast-tracked digital learning adoption in Kenya primary schools. The government providing financial support of the migration exercise for a three-year were some of the steps initiated for digital learning uptake in Kenya (Task Force Report, 2015). Currently the Government of Kenya through the MOEST, ICT authority, Jomo Kenyatta University of Agriculture and Technology and Moi university is rolling out digital literacy program for pupils in class one in primary schools.

Despite the involvement of digital learning in development of learning programs in primary schools to take new levels and yield better results use of e-learning, the extent of these influence on pupils has not been realized. However, for concerted efforts to be realized there is need for existence of certain levels of acceptability and usability of these digital tools by teachers and learners since successful teaching interventions will have to rely on laptop use and other electronic devices to engage and inform pupils. Digital learning is the new platform for dissemination of teaching resources, knowledge to the teachers and pupils. Digital learning influences how development of educational resources is delivered in such a way that there is wide participatory process of social-educational change in a primary school set up. Digital learning brings about both social and material advancement, including greater equality, new information and other valued qualities for most pupils through their gaining greater control in learning. This study therefore sought to find out the influence of digital learning acceptability on learners' educational outcome among pupils selected in primary schools in Nairobi city county. In summary, this study was an attempt to uncover the influence of digital learning acceptability on learners' educational outcome. The study sought to analyze the factors related to accessibility of ICT learning resources, integration of digital instructional tools and materials, usability of ICT tools and acceptability of ICT methods and tools as ways of improving the learners' educational outcome.

## II. METHODOLOGY

This study adopted cross-sectional survey design, to study a sample of 273 participants comprised of pupils and teachers, drawn from 30 sample schools from a population of 390 schools. According to Anders (2012), cross-sectional survey research method is used to study many subjects drawn from a defined population. The target population for this study was relatively large prompting for sampling and subsequently the utilization of cross-sectional survey design to save on cost and time and to enable generalization of the research findings. Anders (2012) adds that survey design is used to describe people and their beliefs, attitude and behavior for building theories or generalization about a population. Cross-sectional survey collects data from a target population or sample at one point in time (Anders, 2012). Thus, this design provided current conditions of the phenomenon by collecting information using questionnaires, structured interviews and observation guide at one point in time and analyzing the data quantitatively. The target population for the study consisted of the primary schools in Nairobi city. The boy pupil population in this area is approximately 9,958 while the girl pupil population is about 9,939 of which the total population is 19,897 pupils (Uwezo Kenya, 2016). These are of ages ranging from 12 to 17 years old. The number of primary teachers in the area is 2470 (Uwezo Kenya, 2016).

The sample selected from this target population was 200 participants. Nairobi was chosen as the area of study for these reasons: First, it is part of the area where the pilot digital learning migration transition was slated to take place and hence a propensity to have an awareness and secondly most schools are already equipped with infrastructure such electricity and ICT labs and hence suitability of the digital learning. These schools are categorized into eight; Day Only Ordinary, Day Only Special, Day Only Integrated, Day and Boarding Ordinary, Day and Boarding Special, Day and Boarding Integrated, Boarding Only Ordinary and Boarding special public primary schools (Open Data Kenya, 2014). The sample size for this study comprised of 150 class seven pupils, 35 teachers and 15 headteachers drawn from a sample of 39 schools. To

arrive at the sample, multi - stage random sampling method was used, which involved multiple selection of sampling units before arriving at the final sample unit. Sampling was carried out in stages using smaller and smaller units at each stage (Dickson, 2012). Based on Mugenda and Mugenda (2010), who propose that 10% of the result. Population for large samples was adequate, this study used 10% of the population at each stage to arrive at the sample. A sample of 39 schools were selected representatively from 390 schools in the six constituencies using simple random sampling.

The study chose 10% of the number of 390 (39) schools, of which the total population is 19,897 pupils ,2470 teachers (Uwezo Kenya, 2016). The sampling technique used was purposive sampling technique which is a type of non-probability sampling. The targeted group of individuals was based on a specific purpose; in this case, the teachers to provide relevant information regarding their perception of the learners outcome in use of digital learning .This sampling method meant to achieve the representation of a broader group, which is the population of Nairobi city county. Data was collected using three kinds of instruments; questionnaires, checklist and a pupils' test. Questionnaires were used to collect information from teachers, head teachers and pupils. Questionnaires were appropriate for this study because they enabled the researcher collect a lot of information at once. The checklist was used to collect information which helped to ascertain reliability of the information collected using the questionnaires. The pupils' test was used to collect information on the ability of the pupils to digitally read simple words and text.

A pilot test of the instruments was conducted before the main study. This helped to establish the reliability and validity of the instruments. Participants were selected from one of the schools in Nairobi city. The selected school was not considered for the main study. The researcher administered the instruments personally. From the collected data, the researcher checked for any inconsistency on the items ability to collect the intended information. The irrelevant items were removed or replaced. Internal consistency reliability of the instruments was calculated with the help of Statistical Package for Social Science (SPSS) version 22. The internal consistency of the items for each variable was determined by calculating the Cronbach's alpha coefficient using SPSS version 22. Cronbach's alpha was expressed as a correlation coefficient ranging from 0 to +1. Its coefficient measured how well items in the instrument were positively correlated to one another. The closer the estimated Cronbach's alpha coefficient to 1, the higher the internal reliability of the instrument. According to the guidelines provided by DeVellis (2011) an alpha coefficient above 0.7 is acceptable. The items making up the three sets of variables in the pilot study produced an average alpha of 0.80 and this was considered satisfactory since it was above 0.7.

Validity is the extent to which inference made based on numerical scores is appropriate, meaningful and useful (LeFevre, 2013). The study used three types of data collection instruments (questionnaires checklist and a reading test) to foster an essence of triangulation which would increase validity. The researcher sought the opinion of peers, supervisors and experts in the areas of Education and Research at the University on validity of the tools. This assisted in examination of the content and the degree to which the instruments collected the intended information. Data was analyzed with the help of SPSS version 22. Data was coded, entered in the computer and analyzed using descriptive and inferential statistics. Summarized data was presented in tables and figures. Descriptive statistics was utilized to analyze demographic data from all the instruments. This included age of pupils, gender, level of academics and length of service. Data for answering research questions was coded and the frequency of the various answers established. Raw data collected was recorded and analyzed to bring into focus the evidence that supported the purpose of the research. Percentages and frequencies resulting from the study were derived using Statistical Package for Social Science (SPSS) version 22.0. The analyzed results were presented in the form of graphs thus forming conclusions in relation to the influence of digital learning acceptability phenomenon. The dependent variable being the influence of digital Demographics such as gender, age, were intervening variables expound the relationship between the independent and dependent variables. A multiple regression model was used to show the relationship between the independent variables to the dependent variable as follows:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon$$

Where:

Y = Learners' educational outcome

X1 = Accessibility of ICT learning resources

X2 = Integration of digital instructional tools and materials

X3 = Acceptability of ICT methods & tools

X4 = Usability ICT tools

In the model,  $\beta_0$  = was the constant term while the coefficients  $\beta_i = 1, \dots, 4$  were used to measure the sensitivity of the dependent variable (Y) to unit change in the predictor variables  $X_1, X_2, X_3$  and  $X_4$ .  $\epsilon$  was the error term which was used to capture the unexplainable variations in the model. Data was presented using pie charts and tables which are reader friendly and were easy to interpret.

### III. FINDINGS

The study targeted a sample size of 200 respondents from which 185 filled in and returned the questionnaires. This gave a response rate of 92.5% as indicated in table 1. This response rate was satisfactory to make conclusions for the study. The response rate was representative. According to Mugenda and Mugenda (2003), a response rate of 50% is adequate for analysis and reporting; a rate of 60% is good and a response rate of 70% and over is excellent. Based on the assertion, the response rate of 92.5% was considered excellent.

**Table 1: Response Rate**

	Questionnaires Administered	Questionnaires Filled	Percentage
Respondents	200	185	92.5%

A pilot study was carried out to determine the reliability and validity of the questionnaires. The pilot study involved 10% of sample size-class seven pupils, teachers and headteachers. Reliability analysis was subsequently done using Cronbach's Alpha which measured the internal consistency by establishing if certain items within the scale measured the same construct. Gliem and Gliem (2003) established the Alpha value threshold at 0.7, thus forming the study's benchmark. The Cronbach Alpha was established for every objective. The table 2 shows that accessibility of ICT learning resources had the highest reliability ( $\alpha = 0.872$ ), followed by ICT tools usability ( $\alpha = 0.842$ ), of integration of digital instructional materials ( $\alpha = 0.823$ ) and ICT methods & tools acceptability ( $\alpha = 0.814$ ). This illustrates that all the four variables were reliable as their reliability values exceeded the prescribed threshold of 0.7 and therefore the instruments were considered reliable.

**Table 2: Reliability test Results**

Variable	Cronbach's Coefficient	No. of Item	Remark
Accessibility of ICT learning resources	0.872	4	Accepted
Integration of digital instructional materials	0.823	4	Accepted
Usability of ICT tools	0.842	4	Accepted
Acceptability of ICT teaching methods/tools	0.814	4	Accepted

The first objective of the study was to analyze the effect of accessibility of ICT learning resources on learner's outcome among primary schools in Nairobi City County. Findings in table 3 shows that most respondents at 55% agreed that they had adequate ICT teaching and learning resources in their schools; while 50% agreed that the quality of ICT resources was good enough for their use; while 60% agreed that had they had the ability to use the ICT resources in their schools. A total of 65% of the respondents agreed that they have support from the school management on use of ICT resources. A total of 55% of the respondents agreed that there were clear guidelines on use of ICT resources to enhance learning, while 59% of the pupil respondents agreed that accessibility of digital learning resources influences learners' educational outcomes. Finding are consistent with those of other scholars. Okumbe (2011) opines that even with the introduction of digital learning, a tool that provides an array of powerful tools that may help transform the present isolated, teacher - centered and text-bound classrooms into rich, student focused interactive knowledge environments, its effectiveness is still to be felt in Kenyan primary schools.

**Table 3: Accessibility of ICT Learning Resources**

Statements on ICT Learning Resources	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	N	Mean	Std. Deviation
We have adequate ICT learning & teaching resources	35%	20	20	15	10	185	4.28	0.891
The quality of ICT resources is good for use	25%	25	20	15	15	185	4.08	0.757
I have the ability to use ICT Resources well	42%	18	12	9	18	185	4.33	0.851
The school management supports the use of ICT during the teaching/learning process.	35	30	10	12	13	185	3.73	0.741
There are clear guidelines on use of ICT	30	25	16	18	25	185	4.22	0.661
Accessibility to digital learning resources influences digital education learning educational outcomes	35	24	14	15	12	185	3.75	0.74
<b>Average</b>							<b>4.25</b>	<b>0.721</b>

The second objective of the study was to establish the influence integration of digital instructional tools & materials on learner educational outcomes. The results in table 4 show that 51% of the respondents both teachers and students agree that they possessed relevant skills for ICT integration into the teaching -learning process, while 45% of the respondents agreed that there were digital literacy development platforms in school. A total of 50% of the respondents agreed that the curriculum design is supportive to the digital integration. A minority 38% of the respondents agreed that the methods of assessment encourage ICT integration, while 47% agreed that there is good M & E to ensure digital integration in the teaching-learning process. A total of 67% respondents agreed that integration of digital instructional tools & materials influences learning educational outcomes. The findings concur with those of other scholars.

Vygotsky *et. al.* (2015) recommends that Schools, led by principals, need to develop a more integrated approach to learning support and teaching resources.

**Table 4: Integration of digital Instructional Tools and Materials**

Statements on Integration of digital Instructional tools & materials	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	N	Mean	Standard Deviation
I possess relevant ICT integration Skills	24	27	22	11	16	185	3.92	0.882
There are digital literacy development platforms	26	19	9	26	20	185	4.04	0.969
The curriculum design supports digital integration	30	20	16	9	8	185	3.8	0.764
The assessment encourages ICT integration in the teaching-learning process	25	13	21	22	19	185	3.73	0.741
There is good M&E to ensure digital integration	20	27	10	18	25	185	3.99	0.884
Integration of digital learning tools influences learning educational outcomes	36	31	14	10	9	185	3.75	0.74

The third objective of the study was to find out the influence of acceptability of ICT tools and methods on the learning educational outcomes. Findings in table 5 Show that 44% of the respondents have high adaptability to the use of ICT tools. A total of 40 % of the respondents agreed that there are digitized learning activities included in our lessons, while 48% agreed that there was good level of learner interaction with ICT tools. A total of 58% of the respondents agreed that there is support from the school management towards ICT usage, while 56% of the respondents agreed that they practice use of ICT outside class time and 42 % of the respondents agreed that acceptability of ICT tools influences learner educational outcomes. The findings agree with those of other scholars. Lehl and Grosse (2013) found out that early literacy experiences in everyday context in the home provided a useful foundation for successful literacy learning in school.

**Table 5: Acceptability of ICT Methods & Tools**

Statements on Acceptability of ICT methods and tools	Strongly Agree	Agree	Neutral	Disagree	Strongly	Mean	Std. Deviation
High adaptability to the use of ICT methods & tools	21	23	8	25	23	3.24	1.086
We have digitized learning activities in our lessons.	29	12	20	22	18	3.18	1.031
Good level of learner interaction with ICT tools	23	25	16	26	10	3.33	1.148
Support from school management towards ICT Usage	37	21	19	15	8	4.02	0.968
Acceptability of ICT methods & tools influences learner educational outcomes.	26	30	17	15	12	3.17	1.022
<b>Average</b>						<b>3.221</b>	<b>1.023</b>

The fourth objective of the study was to find out the influence of usability of ICT tools on the learning educational outcomes. Findings in table 6 Shows that 54% of the respondents agreed that the instructors' skills are good, while 55% of the respondents agreed that the level of knowledge of both the pupils and learners is good. A total of 53% of the respondents agreed that the frequency of computer lessons is good , while 50% Of the respondents agreed that intuitiveness is good. A total of 63% of the respondents agreed that usability of ICT tools influences learner educational outcomes. These findings agree with those of other scholars. Technology can be used very effectively as a short but focused intervention to improve learning Eivers *et al.* (2010)), particularly when there is regular and frequent use about three times a week: From Eivers *et al.* (2010) over the course of about a term (5 -10 weeks: LeFevre, 2014; Linnakyla, 2014).

**Table 6: Influence of usability of ICT tools on the learning educational outcomes**

Statements on Usability of ICT Tools	Strongly Agree	Agree	Neutral	Disagree	Strongly	N	Mean	Std. Deviation
Instructor skills are good	25	29	18	14	14	185	4.07	0.956
Level of knowledge	29	26	19	15	11	185	4.17	0.974
Level of experience	32	21	18	16	13	185	4.03	0.942
Frequency of computer lessons is good	26	27	13	23	14	185	4.08	1.038
Intuitiveness	30	20	29	12	9	185	4.34	0.955
Usability of ICT tools influences learner educational outcomes	28	35	17	10	10	185	4.06	0.951

The fifth objective of the study was learners’ educational outcomes. The indicators under this study were computed to help the study describe the dependent variable. The findings in table 7 show that 54% of the respondents agreed that there were high scores in ICT, while 49% agreed that there was clarity in problem solving using ICT tools and 57% of the respondents agreed that they could effectively communicate using ICT tools. A total of 35% respondents agreed that there was a fair level of acquisition of ICT skills among the pupils. A total of 58% of the respondents agreed that there was a high level of motivation among the pupils towards use of ICT. A total of 63% respondents agreed that digital learning acceptability influences digital learning educational outcomes. Findings concur with those of other scholars. In the UK, the Impact 2 study (McMillan *et al.*, 2011) identified statistically significant findings positively associating higher levels of ICT use with school achievement at each Key Stage, and in English, Maths, Science, Modern Foreign Languages and Design Technology.

**Table 7: Learners educational outcomes**

Statements on Learners Educational outcome	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Mean	Std. Deviation
There are high scores in ICT Subjects	25	29	10	12	14	4.04	0.906
Clarity in problem solving using ICT Tools	23	26	23	15	13	4.11	0.933
Communication using ICT	29	28	19	18	6	4.1	1.004
Enhanced ICT skills	20	15	22	29	14	3.99	0.903
High level of motivation	33	25	14	7	3	4.04	0.88
Learning educational outcomes are influenced by digital learning acceptability	30	33	19	8	10	4.05	0.952
<b>Average</b>						<b>4.111</b>	<b>0.922</b>

On the correlation of the study variable, the study conducted a Pearson Moment Correlation. From the findings in table 8, the results show that there was a strong positive correlation coefficient between accessibility of ICT learning resources and learners’ educational outcome as shown by an r value of 0.768 and this relationship was found to be statistically significant since the p value was 0.002 which is less than 0.05; the study also found strong positive correlation between integration of digital instructional tools & methods and learners’ educational outcomes as shown by correlation coefficient of 0.826, and this relationship was significant at p value of 0.001 which was less than 0.05 which was the conventional value of this study. The study also found strong positive correlation between acceptability of ICT methods & tools and learners educational outcomes as shown by correlation coefficient of 0.689. This relationship was found to be significant since the p value was 0.003, which was less than the conventional 0.05 value for this study. In commenting on digital learning uptake in USA, Linnakyla (2014) indicates that over three million students in USA are now registered in digital learning based academic courses, with an estimated 20% of the courses being currently offered using internet technologies.

**Table 8: Correlation Matrix**

		Accessibility of ICT Learning Resources	Integration of digital instructional tools	Acceptability of ICT methods & Tools	Usability of ICT tools	Learners' Educational Outcome
Accessibility of ICT Learning Resources	Pearson Correlation	1				
	Sig (2-tailed)	0				
Integration of digital instructional tools	Pearson Correlation	0.768	1			
	Sig (2-tailed)	0.002	0			
Acceptability of ICT	Pearson	0.826	0.469	1		



<b>methods &amp; Tools</b>	Correlation					
	Sig (2-tailed)	0.001	0.051	0		
<b>Usability of ICT tools</b>	Pearson	0.689	0.532	0.563	1	
	Correlation					
	Sig (2-tailed)	0.003	0.047	0.075	0	
<b>Learners' Educational Outcome</b>	Pearson	0.726	0.399	0.459	0.364	1
	Correlation					
	Sig (2-tailed)	0.002	0.073	0.059	0.097	0
<b>N</b>	<b>185</b>	<b>185</b>	<b>185</b>	<b>185</b>	<b>185</b>	<b>185</b>

Adjusted R squared is the coefficient of determination which indicates the variation in the dependent variable due to changes in the independent variables. From the findings in the table 9 the value of adjusted R squared was 0.698 an indication that there was variation of 69.8% on the learners' educational outcomes due to changes in accessibility of ICT learning resources, integration of digital instructional tools, acceptability of ICT methods and tools and usability of ICT tools at 95% confidence interval. This finding agrees with those of other scholars. According to Teale (2010) digital learning enhances provision of education contents and material through technology at convenient time and place and effectively ensuring achieving the curriculum objectives.

**Table 9: Model Summary**

Model	R	R-Square	Adjusted R-Square	Std. Error of the Estimate
1	0.849a	0.721	0.698	0.0342

From the ANOVA statics in the Table 10 below, the processed data, which is the population parameters, had a significance level of 0.5% which shows that the data is ideal for making a conclusion on the population parameters as the value of significance (p-value) is less than 5%. The F calculated value was greater than the F critical value (5.922>2.306) an indication that there was significant relationship between accessibility of digital learning resources, integration of digital learning tools, acceptability of ICT methods & tools and usability of ICT tools. The significance value was less than 0.05 indicating goodness of fit of the model and that the independent variables are good predictors of the dependent variable. Ogula (2013) agreeing with this position observes that for e-learning education to be effective, must be relevant and geared towards providing pupils with the required knowledge, skills, attitudes and value to survive, thrive and competently take up responsibilities in a modernized, ever-changing and increasingly complex world.

**Table 10: ANOVA Results**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2.322	4	0.581	5.922	0.005 <sup>b</sup>
	Residual	9.312	180	0.098		
	Total	11.634	184			

Further tests were done to establish how much change would be experienced in the dependent variable based on a unit change in each of the independent variables. Findings in table 4.13 revealed that holding accessibility of ICT learning resources, integration of digital instructional tools, acceptability of ICT methods & tools and usability of ICT tools to a constant zero, learners' educational outcomes would stand at 1.221. The results further revealed that a unit increase in accessibility of ICT learning resources would lead to improvement in learners' educational outcome by a factor of 0.439. A unit increase in, integration of digital instructional tools would lead to improvement in learners' educational outcomes by factors of 0.513. A unit increase acceptability of ICT tools and methods would lead to improvement in learners' educational outcome by a factor of 0.486 and unit increase in usability of ICT tools would lead to an improvement in learners' educational outcome by a factor of 0.508. The study further revealed that accessibility of ICT learning resources, integration of digital instructional tools, acceptability of ICT methods & tools and usability of ICT tools were statistically significant to influencing learners' educational outcome, since all the p value (sig) were less than 0.05. The study also found that there was a positive relationship between learners' educational outcome and accessibility of ICT learning resources, integration of digital instructional tools acceptability of ICT tools & methods and usability of ICT tools. According to Teale (2010) opines digital learning enhances provision of education contents and material through technology at convenient time and place and effectively ensuring achieving the curriculum objectives.

**Table 11: Coefficients Results**

	B	Std. Error	Beta	t	Sig.
(Constant)	1.221	0.178		6.86	0.002
Accessibility of ICT learning resources	0.439	0.098	0.411	4.480	0.004
Integration of digital instructional tools	0.513	0.091	0.479	5.637	0.004
Acceptability of ICT tools/methods	0.486	0.064	0.358	7.594	0.001
Usability of ICT tools	0.508	0.061	0.455	8.328	0.000

The optimized regression equation was established to be:

$$Y = 1.221 + 0.513X_1 + 0.508X_2 + 0.486X_3 + 0.439X_4 + 0.178$$

#### IV. DISCUSSIONS

The main purpose of this study was to empirically establish the influence of digital learning acceptability on learners' educational outcomes among primary schools in Nairobi City County. Specifically, the study was to find out the influence of accessibility of ICT learning resources, integration of digital instructional tools, acceptability of ICT tools and methods and usability of ICT tools on learners' educational outcomes. A total of 185 questionnaires were filled and returned. The first objective of the study was to determine the influence of accessibility of ICT learning resources on learners' educational outcome in primary schools in Nairobi City County. Various tests were carried out to determine the relationship that existed between the two variables. The study found that accessibility of ICT learning resources had a positive and significant influence on learners' educational outcome,  $r = .547, p = .000$ . The beta coefficient results showed that accessibility of ICT learning resources would lead to increase in learners' educational outcome by a factor of 0.439. This coefficient of accessibility of ICT learning resources and learners' educational outcome was significant since it had a p-value of 0.004 which was less than 0.05.

The second objective of the study was to determine the influence of integration of digital instructional tools on learners' educational outcome. The study found that integration of digital instructional tools had a moderate positive significant relationship with learners' educational outcome,  $r = .550, p = .000$ . The beta coefficient results showed that integration of digital instructional tools would lead to increase in learners' educational outcome by a factor of 0.513. This coefficient of integration of digital instructional tools and learners' educational outcome was significant since it had a p-value of 0.004 which was less than 0.05. The third objective of the study was to determine the influence of acceptability of ICT tools and materials on learners' educational outcome in Primary schools in Nairobi City County, Kenya. The study found that acceptability of ICT tools and materials had a strong positive significant relationship with learners' educational outcome,  $r = .715, p = .000$ . The beta coefficient results showed that acceptability of ICT tools would lead to increase in learners' outcome by a factor of 0.486. This coefficient of integration of digital learning tools and learners' educational outcome was significant since it had a p-value of 0.001 which was less than 0.05. The fourth objective of the study was to determine the influence of usability of ICT tools and materials on learners' educational outcome in Primary schools in Nairobi City County, Kenya. The study found that usability of ICT tools and materials had a strong positive significant relationship with learners' educational outcome  $r = .745, p = .000$ .

The beta coefficient results showed that usability of ICT tools and materials would lead to increase in learners' outcome by a factor of 0.508. This coefficient of integration of digital learning tools and learners' educational outcome was significant since it had a p-value of 0.000 which was less than 0.05.

#### V. CONCLUSIONS

The study found that accessibility of digital learning resources was statistically significant to learners' educational outcome. This implies that a unit increase accessibility of digital learning resources will lead to an improvement in learners' educational outcome. The study concludes that accessibility of digital learning resources is positively related to learners' educational outcome. From the foregoing, it can be concluded that an improvement in accessibility to digital learning resources leads to a positive improvement in digital learning educational outcome in Nairobi City County, Kenya. The study found that integration of digital learning tools and materials was statistically significant to learners' educational outcome. This implies that a unit increase in integration of digital learning tools will lead to an

improvement in learners' educational outcome. The study concludes that integration of digital learning tools is positively related to learners' educational outcome. From the forgoing, it can be concluded that an improvement in integration of digital learning tools leads to a positive improvement in digital learning educational outcome in Nairobi City County, Kenya.

The study found that acceptability of ICT teaching/learning methods was statistically significant to learners' educational outcome. This implies that a unit increase acceptability of ICT teaching/learning methods will lead to an improvement in learners' educational outcome. The study concludes that acceptability of ICT teaching/learning methods is positively related to learners' educational outcome. From the forgoing, it can be concluded that an improvement in acceptability of ICT teaching/learning methods leads to a positive improvement in digital learning educational outcome in Nairobi City County, Kenya. The study found that usability of ICT tools and materials was statistically significant to learners' educational outcome. This implies that a unit increase accessibility in usability of ICT tools will lead to an improvement in learners' educational outcome. The study concludes that usability of ICT tools is positively related to learners' educational outcome. From the forgoing, it can be concluded that an improvement in usability of ICT tools leads to a positive improvement in digital learning educational outcome in Nairobi City County, Kenya.

## VI. RECOMMENDATION AND SUGGESTIONS

The study therefore recommends that the government of Kenya and other policy makers in the education sector should stipulate policies that would improve the instruments of accessibility to digital learning resources, integration of digital learning tools and materials, acceptability of ICT learning methods and usability of ICT tools to improve learners' educational outcomes. There is need also to invest in ICT resources, materials and tools with the involvement of primary schools' stakeholders since the findings indicated that digital learning acceptability can enhance learners' educational outcomes in Primary schools in Nairobi city County. The study also recommends that the government of Kenya and other policy makers in the education sector should stipulate policies that would improve the of integration of digital learning tools accessibility to improve learners' educational outcomes. There is need also to invest in ICT tools with the involvement of primary schools' stakeholders since the findings indicated that integration of digital learning tools can enhance learners' educational outcomes in Primary schools in Nairobi city County. There is also a need to invest in training the teachers and other resource persons to enhance their skills, knowledge and overall prowess in handling ICT at the classroom level. The curriculum developers need to suggest methods to help institutionalize ICT in the primary school curriculum.

The study also recommends that the government of Kenya and other policy makers in the education sector should stipulate policies that would improve the of acceptability of use of ICT methods to improve learners' educational outcomes. There is need also to invest in user friendly ICT methods with the involvement of primary schools' stakeholders since the findings indicated that acceptability of ICT learning methods can enhance learners' educational outcomes in Primary schools in Nairobi city County. There is also a need to invest in attitude change training for the teachers and other resource persons to embrace full use of ICT methodologies. There is need for a paradigm shift in from the traditional methods of teaching to more modern use of ICT.

The study also recommends that the government of Kenya and other policy makers in the education sector should stipulate policies that would enhance usability of ICT tools and materials in the teaching learning process to improve learners' educational outcomes. There is need also to invest in user friendly ICT processes that enhance the ICT interface during the teaching / learning process. There is also a need to develop platforms that enhance intuition in use of ICT among the teachers and other ICT resource persons. This study investigated the influence of digital learning acceptability on the learning educational outcomes in primary schools in Nairobi City County, Kenya.

The study recommends that; a similar study should be done in primary schools in other counties for comparison and to allow for generalization of findings on the influence of digital learning acceptability on the learning educational outcomes in primary schools. Future studies should focus on studying the influence of other digital learning acceptability variables other than accessibility of ICT learning resources, integration of digital instructional tools and materials, acceptability of ICT methods & usability of ICT tools as was the case with this study.

### REFERENCES

- [1] Akinsolu, A. O. (2010). Teachers and students' academic performance in Nigerian secondary schools: Implications for planning. *Florida Journal of Educational Administration & Policy*, 3(2),86-103.Retrieved October21st, 2014 from [http://education.ufl.edu/fjeap/files/2011/01/FJEAP\\_Summer\\_2010\\_32Akinsolu.pdf](http://education.ufl.edu/fjeap/files/2011/01/FJEAP_Summer_2010_32Akinsolu.pdf)
- [2] Anders, Y., Rossbach, H., Weinert, S., Ebert, S., Kuger, S., Lehl, S. & Maurice, J. V. (2012).
- [3] Home and preschool learning environments and their relations to the development of early numeracy skills. *Journal of Early Childhood Research Quarterly*, 27(2012), 231-244. Retrieved March 7th, 2014 from <http://dx.doi.org/10.1080/02671522.2013.792865>.
- [4] Austin, G., Duerr, M., Poynor, L. & Truebridge, S. (2011). *California School Climate Survey Guidebook, Part 2: Survey Content*. San Francisco: WestEd Health and Human Development Program. Retrieved September 10th, 2014 from [https://cscs.wested.org/resources/cscs\\_guidebook\\_2\\_content.pdf](https://cscs.wested.org/resources/cscs_guidebook_2_content.pdf)
- [5] Australian Government (2010). *Literacy literature review for evidence based practices framework*. Australia: Department of Education and Training. Retrieved February 2nd, 2014 from [http://www.education.nt.gov.au/data/assets/pdf\\_file/0004/11398/LiteratureReviewLiteracy.p](http://www.education.nt.gov.au/data/assets/pdf_file/0004/11398/LiteratureReviewLiteracy.p).
- [6] Bunyi, G. W. (2015). Real options for literacy policy and practice in Kenya. Paper commissioned for EFA Global Monitoring Report 2006, *Literacy for life*. Retrieved April 4th, 2014 from <http://unesdoc.unesco.org/images/0014/001459/145956e.pdf>
- [8] Capital News (3rd September, 2013). Low primary school literacy levels worry Uhuru. Retrieved March 7th, 2014 from; <http://www.capitalfm.co.ke/news/2013/09/low-primary-school-literacy-levels-worry-uhuru/>
- [9] Cargan, L. (2010). *Doing social research*. United States of America: Rowman & Littlefield Publishers, Inc.
- [10] Capital News (3rd September, 2013). Low primary school literacy levels worry Uhuru. Retrieved March 7th, 2014 from; <http://www.capitalfm.co.ke/news/2013/09/low-primary-school-literacy-levels-worry-uhuru/>
- [11] Cox, M., Preston, C. & Cox, K. (2014). What Factors Support or Prevent Teachers from Using ICT in their Classrooms? Paper presented at the British Educational Research Association Annual Conference, University of Sussex, Brighton, November.
- [12] De Bortoli, L. & Thomson, S. (2010). Contextual factors that influence the achievement of Australia's Indigenous students: Results from PISA 2000–2006. Retrieved April 7th, 2014 from <http://research.acer.edu.au/ozpisa/7>
- [13] Dickson, D. K. & Neuman, S. B. (2016). *Handbook of early literacy research*, 2, 288-367. New York, NY: Guilford Press.
- [14] Davis J., Foxall G. and Pallister J. (2012).Beyond the intention-behavior mythology: An integrated model of recycling, *Marketing Theory* 2 (1), pp.29-113.
- [15] Drent, M. and M. Meelissen (2015). Which factors obstruct or stimulate teacher educators to use ICT innovatively?" *Computers & Education* 51(1), 187-199.
- [16] Duhaney, D. C. (2011). Teacher education: Preparing teachers to integrate technology.*International Journal of Instructional Media*, 28(1), 23–30.
- [17] De Bortoli, L. & Thomson, S. (2010). Contextual factors that influence the achievement of Australia's Indigenous students: Results from PISA 2000–2006. Retrieved April 7th, 2014 from <http://research.acer.edu.au/ozpisa/7>
- [18] Eivers, E., Close, S., Shiel, G., Millar, D., Clerkin, A., Gilleece, L. & Kiniry, J. (2010).
- [19] *The National Assessments of Mathematics and English Reading*. Government publication, Dublin. Retrieved April 2nd, 2014 from <http://www.erc.ie/%3Fp%3D4>

**International Journal of Novel Research in Computer Science and Software Engineering**

 Vol. 6, Issue 1, pp: (1-16), Month: January - April 2019, Available at: [www.noveltyjournals.com](http://www.noveltyjournals.com)

- [20] Farooq, M. S., Chaudhry, A. H., Shafiq, M. & Berhanu, G. (2011). Factors affecting students' quality of academic performance: A case of secondary school level. *Journal of Quality and Technology Management*, 7(2), 01 - 14. Retrieved April 7th, 2014 from <http://pu.edu.pk/images/journal/iqtm/PDF-FILES/01-Factor.pdf>.
- [21] Frigo, T., Corrigan, M., Adams, I., Hughes, P., Stephens, M. & Woods, D. (2014). Supporting English literacy and numeracy learning for indigenous students in the early years.
- [22] Australian Council for Educational research. Retrieved April 9th, 2014 from [http://acer.edu.au/documents/Mono\\_57-SupportingEnglishLearningForIndigenous.pdf](http://acer.edu.au/documents/Mono_57-SupportingEnglishLearningForIndigenous.pdf)
- [23] Fouka, G. & Mantzorou, M. (2011). What are major ethical issues in conducting research? Is there a conflict between the research ethics and the nature of nursing? *Health Science Journal*, 5(1). Retrieved February 6th, 2014 from <http://www.hsj.gr/volume5/issue1/512.pdf>
- [24] Githogo, W. (2012). Kenyan schools churning out 'illiterates'. *Standard digital news-Kenya*. Retrieved April 22nd, 2014 from <http://www.standardmedia.co.ke/%3FarticleID%3D203>
- [25] Government of Kenya (2017), Kenya Vision 2030: A Globally Competitive and Prosperous Kenya, Government of Kenya, Nairobi, Kenya.
- [26] Government of Kenya (2016). National information and communication technology (ICT) strategy for education and training. Ministry of Education. Marshal MN. The key informant technique. *FamPract* 1996; 13: 92-97.
- [27] Industry Skills Councils (2011). No more excuses; literacy and numeracy challenge. Australia: Industries Skills Councils. Retrieved April 22nd, 2014 from [http://www.isc.org.au/pdf/NoMoreExcuses\\_FINAL%2520single%2520page.pdf](http://www.isc.org.au/pdf/NoMoreExcuses_FINAL%2520single%2520page.pdf)
- [28] Kenya Open Data (2014). Public primary schools. Retrieved April 22nd, 2014 from <https://www.opendata.go.ke/facet/counties/Nyeri%3Ftags%3Dschoools>
- [29] LeFevre, J., Smith-Chant, B. L., Skwarchuk, S., Fast, L., Kamawar, D. & Bisanz, J. (2014).
- [30] Home numeracy experiences and children's math performance in early years. *Canadian Journal of Behavioral Science*, 41(2), 55-56. Retrieved April 7th, 2014 from DOI: 10.1037/a0014532
- [31] Linnakyla, P., Malin, A. & Taube, K. (2014) Factors behind low reading literacy achievement, *Scandinavian Journal of Educational Research*, 48(3), 231-249. Retrieved from <http://dx.doi.org/10.1080/00313830410001695718>
- [32] Lehrl, S., Smidt, W., Grosse, C. & Richer, D. (2013). Patterns of literacy and numeracy activities in preschool and their relation to structural characteristics and children's home activities. *Research Papers in Education*.
- [33] Tylor & Francis Online publication. Retrieved November 11th, 2014 from <http://dx.doi.org/10.1080/02671522.2013.792865>
- [34] Loukas, A. (2014). What is School climate? Retrieved August 28th, 2014 from [https://www.naesp.org/resources/2/Leadership\\_Compass/2007/LC2007v5n1a4.pdf](https://www.naesp.org/resources/2/Leadership_Compass/2007/LC2007v5n1a4.pdf)
- [35] Linnakyla, P., Malin, A. & Taube, K. (2014). Factors behind low reading literacy achievement, *Scandinavian Journal of Educational Research*, 48(3), 231-249. Retrieved from <http://dx.doi.org/10.1080/00313830410001695718>
- [36] Macneil A.J., Prater D.L., and Busch S. (2014). The effects of school culture and climate on student achievement, *International Journal of Leadership in Education*, 2(1), 73-84. Retrieved Sept 19th, 2014 from <http://www.tandf.co.uk/journals>
- [37] McLeod, S. A. (2013). Lev Vygotsky. Retrieved from <http://www.simplypsychology.org/vygotsky.html>
- [38] Mcmillan, J. H. & Schumacher, S. (2011). *Research in Education*. London: Addison Wesley Longman.
- [39] Morrow, V. (n.d). The ethics of social research with children and young people – an overview. Retrieved August 28, 2014 <http://www.ciimu.org/reports.pdf>

**International Journal of Novel Research in Computer Science and Software Engineering**

 Vol. 6, Issue 1, pp: (1-16), Month: January - April 2019, Available at: [www.noveltyjournals.com](http://www.noveltyjournals.com)

- [40] Mathipa , E . R .and Mukhari ,S.(2014).Teacher factors Influencing the use of ICT in teaching and learning in South African Urban schools. Mediterrenian Journal of social sciences. MCSER Publishing,Rome Italy.
- [41] Ministry of Education Science and Technology,(2015).Kenya Education Sector Support Programme . Delivering quality Education and Training to all Kenyans. Government Printers,Nairobi.
- [42] National Research Council (2014). Preventing reading difficulties in young children.
- [43] Snow, C. E., Burns, M. S., & Griffin, P. (Eds). Washington DC: National Academy Press. Retrieved March 3rd,2014 from [http://books.nap.edu/openbook.php?record\\_id](http://books.nap.edu/openbook.php?record_id)
- [44] National Research Council, (2012). Preventing reading difficulties in young children. Washington, DC: National Academy Press.
- [45] Njeru, M. G. (2013). Dialect and the learning of English as a second language in Kenya. English Language Research, 2(1). Retrieved April 12th, 2014 from <http://www.sciedu.ca/journal/index.php/elr/article/download/2855/1692>
- [46] Naoreen, B., Arshad, M. & Aslam, S. (2011). Impact of in-service teacher training on students' learning achievement in mathematics. International Conference on Social Science and Humanity, IPEDR 5(2011). Retrieved October 21st , 2014 from <http://www.ipedr.com/vol5/no2/38-H10124.pdf>
- [47] Ondiegi,M.O.(2014).School factors influencing integration of information communication technology in teaching and learning in public schools,University of Nairobi,Kenya.
- [48] O'connor, J. & Geiger, M. (2012). Challenges facing primary school educators of English second (or other) language learners in the Western Cape Town. South African Journal of Education, Vol.29: 253-269 Retrieved 10th April, 2014 from [http://www.scielo.org.za/scielo.php%3Fscript%3Dsci\\_arttext%26pid%3DS0256-01002009000200007](http://www.scielo.org.za/scielo.php%3Fscript%3Dsci_arttext%26pid%3DS0256-01002009000200007)
- [49] Obala, R. (2013, July 24th). Leaders want learning crisis in Kenya tackled. Retrieved March 14th, 2014 from <http://www.standardmedia.co.ke/lifestyle/article/2000089193/leaders-want-learning-crisis-in-kenya-tackled?pageNo=1>
- [50] OECD (2014), Creating effective teaching and learning environments: First results from TALIS teaching and learning international survey. Retrieved May 20th, 2014 from <http://www.oecd.org/dataoecd/17/51/43023606.pdf>
- [51] OECD (2012). Literacy, numeracy and problem solving in technology-rich environment: Framework for the OECD survey of adult skills. OECD publishing. Retrieved April 7th, 2014 from <http://en.wikipedia.org/wiki/numeracy>
- [52] Ogula, P. A. & Onsongo, J. K. (2013). Handbook on teaching and learning in Higher Education. Nairobi: CUEA Press.
- [53] Okumbe, J.A. (2011). Educational Management; Theory and Practice. Nairobi, Nairobi University
- [54] Onsomu, E. N., Kosimbei, G. & Ngware, M. W. (2016). Impact of gender and social – economic factors on primary education performance in Kenya: Empirical Evidence. Retrieved April 9th,2014 from <http://www.oecd.org/dataoecd/17/51/43023606.pdf>.
- [55] Oppenheim, A. N. (2012). Questionnaire design, interviewing and attitude measurement. New York: Basic Books Inc.
- [56] Orlich, D., Harder, R., Callahan, R. C. & Gibson H. W. (2014). Teaching strategies. A guide to better instruction. Boston, New York: Houghton Mafflin Company.
- [57] OECD (2011), Creating effective teaching and learning environments: First results from TALIS teaching and learning international survey. Retrieved May 20th, 2014 from <http://www.oecd.org/dataoecd/17/51/43023606.pdf>.
- [58] Oppenheim, A. N. (2012). Questionnaire design, interviewing and attitude measurement. New York: Basic Books Inc.

- [59] Farooq, M. S., Chaudhry, A. H., Shafiq, M. & Berhanu, G. (2011). Factors affecting students' quality of academic performance: A case of secondary school level. *Journal of Quality and Technology and Technology*, 7(2), 01-14.
- [60] Rathman, S. & McMillan, J. (2014). Influences on achievement in literacy and numeracy. Australia: The Australian Council for Educational Research Ltd..
- [61] Reche, G.N., Bundi, T.K., Riungu, J.N. & Mbugua, Z.K. (2012). Factors contributing to poor performance in Kenya Certificate of primary education in Mwimbi Division, Maara District, Kenya. *International Journal of Humanities and Social Science*, 12(5). Retrieved April 9th, 2014 from [http://www.ijhssnet.com/journals/Vol\\_2\\_No\\_5\\_March\\_2012/14.pdf](http://www.ijhssnet.com/journals/Vol_2_No_5_March_2012/14.pdf)
- [62] Rensnik, D. B. (2011). What is ethic in research & why is it important? Retrieved April 17th, 2014 from <http://www.niehs.nih.gov/research/resources/bioethics/whatis/>
- [63] Rouse, H. L. & Fantuzzo, J.W. (2013). Validity of the Dynamic Indicators for Early Literacy Skills as an Indicator of Early Literacy for Urban Kindergarten Children. *School Psychology Review*, 35(3), 341-355. Retrieved April 7th, 2014 from <http://josephroddgers.wiki.westga.edu/file/view/Assesment>
- [64] Soft Kenya (n.d.) All about Kenya. Retrieved April 7th, 2014 from <http://softkenya.com/nyeri-County>.
- [65] Sensening, V. (2011). Reading first, libraries last: An historical perspective on the absence of libraries in reading education policy. *Journal of Education*, 191(3). Retrieved March 7th, 2014 from <http://www.bu.edu/journalofeducation/files/2012/07/Volume-191-3.Sensenig.pdf>
- [66] Snow, C. E. & Hemel, S. R. (2011). Early childhood assessment: Why, what, and how. National Research Council. Washington D.C.: The National Academies Press. Retrieved March 31st, 2014 from <http://www.nap.edu>
- [67] Soft Kenya (n.d.) All about Kenya. Retrieved on 7th April, 2014 from <http://softkenya.com/nyeri-county>
- [68] Stables, A., Martin, S. & Arnhold, G. (2014). Student teachers' concepts of literacy and Numeracy. *Research Papers in Education*, 19:3, 345-364. Retrieved February 11th, 2014 from <http://dx.doi.org/10.1080/0267152042000248007>
- [69] Staden, S.V. & Bosker, R. (2011). Factors that affect South African reading literacy achievement: Evidence from prePIRLS 2011 using aspects of Carroll's model of school learning. Retrieved 8th April, 2014 from [http://www.iea.nl/fileadmin/user\\_upload/IRC/IRC\\_2013/Papers/IRC-2013\\_vanStaden\\_Bosker.pdf](http://www.iea.nl/fileadmin/user_upload/IRC/IRC_2013/Papers/IRC-2013_vanStaden_Bosker.pdf)
- [70] Teale, W. H., Paciga, K. A. & Hoffman, J. L. (2010). What it takes in early schooling to have adolescents who are skilled and eager readings and writers. In K. Hall, U. Goswami, C. Harrison, S. Ellis, & J. Soler (Eds.), *Interdisciplinary perspectives on learning to read*:
- [71] UNESCO (2016). Strategies and policies for literacy: Background paper prepared for Education
- [72] For All Global Monitoring Report 2006 Literacy for Life. World Bank: Abadzi, H. (2004).
- [73] UNESCO (2013). Adult and Youth literacy: National regional and global trends, 1985 – 2005. Published by UNESCO Institute for Statistics, Canada. Retrieved March 7th, 2014 from <http://www.uis.unesco.org/Education/Documents/literacy-statistics-trends/2015.pdf>
- [74] UNESCO (2011). The hidden crisis: Armed conflict and education. EFA global monitoring report (2011). UNESCO publishing. Retrieved April 7th, 2014 from <http://www.unesco.org/new/en/education/themes/leading-the-international-agenda/efareport/reports/2011-conflict/>
- [75] UNESCO (2012). The global literacy challenge. A profile of youth and adult literacy at the mid-point of the United Nations literacy decade 2003-2012. United Nations Educational Scientific and Cultural Organization. France. Richmond, M., Robinson, C. & Sachs- Israel, M. Retrieved May 29th, 2014 from <http://unesdoc.unesco.org/images/0016/001631/163170e.pdf>
- [76] UNESCO (2017). Education for all by 2015: Will we make it? UNESCO publishing. Retrieved May 29th, 2014 from <http://unesdoc.unesco.org/images/0015/001548/154820e.pdf>

**International Journal of Novel Research in Computer Science and Software Engineering**Vol. 6, Issue 1, pp: (1-16), Month: January - April 2019, Available at: [www.noveltyjournals.com](http://www.noveltyjournals.com)

- [77] UN (2013). The millennium development goal report 2013. United Nations, New York. Retrieved May 29th, 2014 from <http://www.un.org/millenniumgoals/pdf/report-2013/mdg-report-2013-english.pdf>
- [78] U.S. Department of Education, Office of Educational Research and Improvement, National Center for Education Statistics, (2011). The nation's report card: Fourth-grade reading 2000 (NCES 2001-499). Washington, DC. Retrieved April 29th, 2014 from <http://nces.ed.gov/nationsreportcard/pdf/main2000/2001499.pdf>
- [79] Uwezo Kenya (2014). Annual learning assessment report in 2011: Are our children learning??. Retrieved March 29th, 2014 from; [http://www.uwezo.net/wp-content/uploads/2012/08/KE\\_2011\\_AnnualAssessmentReport.df](http://www.uwezo.net/wp-content/uploads/2012/08/KE_2011_AnnualAssessmentReport.df)
- [80] Vygotsky, L. (2015). Mind in society: The development of higher psychological processes. Cambridge, MA: Harvard University Press.
- [81] Wikipedia the free encyclopedia (2013). Millennium development goals. Retrieved March 29th, 2014 from [http://en.wikipedia.org/wiki/Millennium\\_Development\\_Goals](http://en.wikipedia.org/wiki/Millennium_Development_Goals)
- [82] Williams, M. & Rask, H. (2013). Literacy through play: How families with able children support their literacy development. Journal of Early Childhood development and Care. Vol.173(5), pp. 527-533. Retrieved February 11th, 2014 from <http://dx.doi.org/10.1080/0300443032000088276>
- [83] Wray, D. & Medwell, J. (2011). Effective Teachers of Literacy: Knowledge, Beliefs and Practices, in International Electronic Journal for Leadership in Learning 3(9). Retrieved March 11th, 2014 from <http://iejll.journalhosting.ucalgary.ca/iejll/index.php/iejll/article/view/456/118>
- [84] Wamakote,L.&Hennessy,S.(2010).Developing ICT use in East African schools;Matching policy and practice .Centre for Commonwealth Education & Aga Khan University Institute for Educational Development.Retrieved May 18th,2016 from [http://www.educ.cam.ac.uk/centres/achive/cce/publications/CCE-Report-LitRev\\_June\\_2010.pdf](http://www.educ.cam.ac.uk/centres/achive/cce/publications/CCE-Report-LitRev_June_2010.pdf).