



The impact of integration of Information Communication Technology (ICT) in the teaching of preschool children in Kiambu West Sub-County

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Abstract: *Preschool learning has faced numerous challenges which have raised concerns among preschool education stakeholders. Preschool learners have registered and continued to register dismal grades in basic numeracy, language and creativity skills. Thus, the study examined the influence of teachers' instructional practices on preschool learning in Kiambu West Sub-county, Kiambu County, Kenya. The objective of the study was to examine the impact of integration of Information Communication Technology (ICT) in the teaching of preschool children in Kiambu West Sub-County. This study based on instructional, learning and cognitive theories by Piaget. The study adopted mixed methods approach, concurrent triangulation design. Target population comprised of 80 head teachers, 187 preschool teachers and 240 parents' representatives all totaling to 507. Using the Central Limit Theorem, a sample of 10 preschools and 86 respondents were selected. Stratified sampling was applied to create 5 strata based on number of zones. From each zone, 2 head teachers and 11 preschool teachers were selected using purposive sampling. 4 parents' representatives were selected using simple random sampling. Questionnaires were used to collect data from preschool teachers, interview schedules were used to collect data from head teachers, whereas focus group discussion was used to collect data from parents' representatives and observation checklists were used for collection of data from preschool learners. Piloting was conducted to establish validity, reliability, credibility and dependability. Validity was determined through expert judgement whereas reliability was determined using test retest technique. Reliability coefficient of $r = 0.7$, was realised using Pearson's product moment correlation method, Credibility was ascertained by data triangulation through multiple analysts whereas dependability was established through detailed reportage of the data collection process. Qualitative data was analyzed thematically along the objectives and presented in narrative form whereas quantitative data was analyzed descriptively and inferentially using statistical package for social science (SPSS 23) and presented using statistical tables. The study established that preschool teachers in Kiambu West Sub-county are not prepared for the integration of ICT in the school curriculum and this*

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continues to be a complex and challenging process in most of the county. These results however, affirm the fact that teachers' instructional practices to adopt the use of ICT in preschool learning in the county is critical. Those schools reporting to have integrated information technology in their teaching reported enhanced syllabus coverage, mastery of content and learners' academic performance in basic numeracy, language and creativity skills. The study concludes that teachers' instructional practices need integration of ICT skills in order to enhance learning in preschools. It is also evident that most preschool teachers do not keep records of learners' progress using computer generated hard copies confirming that there is poor utilization of ICT integration in preschools in the sub-county. The study recommends that teachers need attend ICT courses in order to equip themselves with the pre-requisite skills necessary to effectively infuse Information Communications Technology in the learning process.

Key words:

I. INTRODUCTION

Globally, teachers adopt a variety of instructional practices and provide tools, organize workshops and guidance for individuals or children to adapt to new lifestyles. The practice includes both children's academic and social skills as they enter school and teachers' instructional practices to serve all children (Amarel, 2008 and Ball, 2000b). Despite these assertion, little is known about how instructional practices teachers adopt enhance learning in preschool settings which have become a virtual mantra of development. In recent years, mainly as a result of the interest in the articulation of learning theories, researches are increasingly able to differentiate pedagogical strategies by reference to developmental levels of children (Barrowman, 2001).

Combs, Blume, Newman and Wales (2000) describe aspirations for early years practice as practice wherein learning is seen in a holistic non-compartmentalized way, where play, first-hand experiences and talk are the principal means of learning. At the same time, children's capacity to explore and imagine for themselves is nourished by open-ended invitations to engage with the world, and where observation of individual children is the key to developing both curriculum and learning.

According to Gross, Glacuinta and Bernstein (2000), the teacher resource is an important input in achieving the objectives of the Education Sector and is an important component for the successful learning in preschool. Teachers' instructional practices has been identified as a principal factor which contributes to Preschool Learning and excellence at elementary levels of learning. According to Cellitti & Aldridge (2002), teachers' instructional practices includes ability to integrate ICT in classroom, participation in collaboration activities, sound ability to handle and teach learners with diverse needs and readiness to adhere to quality assurance and standards.

There is little evidence that academic background and instructional practices of a teacher can predict effective learning and learner success. The lack of evidence linking observable aspects of instructional practices such as particular teaching strategies, integration of ICT, collaboration and instructional practices to handle and teach learners with diverse needs on teacher effectiveness has examined a relatively small set of teacher characteristics. Teachers' instructional practices are key pillars in preschool learning. However, in Kiambu West Sub-county, preschool learning had been faced with many challenges and has been a concern among preschool education stakeholders.

Preschool learners have registered and continued to register dismal grades in basic numeracy, language and creativity skills. At the same time, instructional practices adopted by preschool teachers have not yielded remarkable results. Despite these observations, little has been done to examine the relationship between teachers' instructional practices on preschool learning. There is little evidence that teachers' teaching strategies, ability to integrate ICT into classroom, handle learners with diverse needs and adherence to quality assurance

and standards as a guarantee for effective and quality learning in preschools; hence the study.

II. LITERATURE REVIEW

This study was guided by the Instructional Theory by Robert Gagne (1999). This theory prescribes how to better help and influence people to learn. It is premised on three general theoretical stances which take part in this influence, that is, behaviorism, cognitivism and constructivism. Instructional theory helps educators, in this case teacher, create conditions that increases the probability of learning. The study was also guided by Piaget's theory of cognitive Learning. Piaget believed that one's childhood plays a vital and active role in a person's development. The theory deals with the nature of knowledge itself and how humans gradually come to acquire, construct, and use it. To Piaget, cognitive development was a progressive reorganization of mental processes resulting from biological maturation and environmental experience. The rationale of adopting these theories is that they encompass different instructional models, instructional strategies and instructional methods. The theories carry out four tasks, that is, knowledge selection, knowledge sequence, interaction management and setting of interaction environment, which are the ingredients of quality instructional practice.

In Kenya, developing teacher effectiveness is as important as measuring it (Eshiwani, 2003). A study conducted in Busia, Ajuoga, Indoshi & Agak (2010) concluded that teachers' participation in standards-based performance assessments help teachers improve their practice. In Kiambu West Sub-county, teachers who have gone through National Board Certification, for example, note that the process of analyzing their own and their learners' work in light of professional standards helps them better assess children's learning and evaluate the effects of their own actions (Asembo, 2003). Asembo (2003) further indicated that teachers also have to adopt new practices that are called for in the standards and assessments, such as engaging learners in learning process.

On instructional practices to integrate ICT in learning, most studies have not indicated how integration of ICT enhances syllabus coverage, learner performance and content delivery. On collaboration, the aspects of collaboration and being mentored may not necessarily contribute to teachers feeling better prepared for classroom demands. The findings may also be clouded by the influence of teaching experience on whether or not teachers were mentored. Again, these patterns may be clouded by the influence of teaching experience, since experienced teachers were more likely than newer teachers to serve as mentors. Although establishing a regular time and space to meet is important, other conditions are required for individuals to work effectively.

One roadblock relates to teacher perceptions. Some teachers prefer working alone; they might feel mistrustful of other staff members, want to protect their territory or resist what they perceive as interference from outsiders. At the same time, although collaboration can thrive in a climate of continuous, positive, and respectful critical inquiry, some teachers mistake critical for criticism and fear that others will point out their instructional shortcomings. On handling and teaching learners with diverse needs, most of the empirical literature reviewed has not exhaustively indicated that teachers' ability to handle and teach learners with diverse needs guarantee quality of learning. On quality assurance and standards, research studies by Ajuoga, Indoshi & Agak (2010) and Asembo (2003) have not indicated how teachers' adherence to quality assurance and standards enhances teachers' ability to cover syllabus, content delivery and learner performance which inherently depends heavily on teachers' professional documents, knowledge, skills and level of training. These were the research gaps which this study sought to address

Conceptual Framework

The figure below explains how dependent variable (preschool learning dynamics indicated by acquisition of numeracy, language and creativity skills is influenced by the independent variable (teachers' instructional practices using ICT).

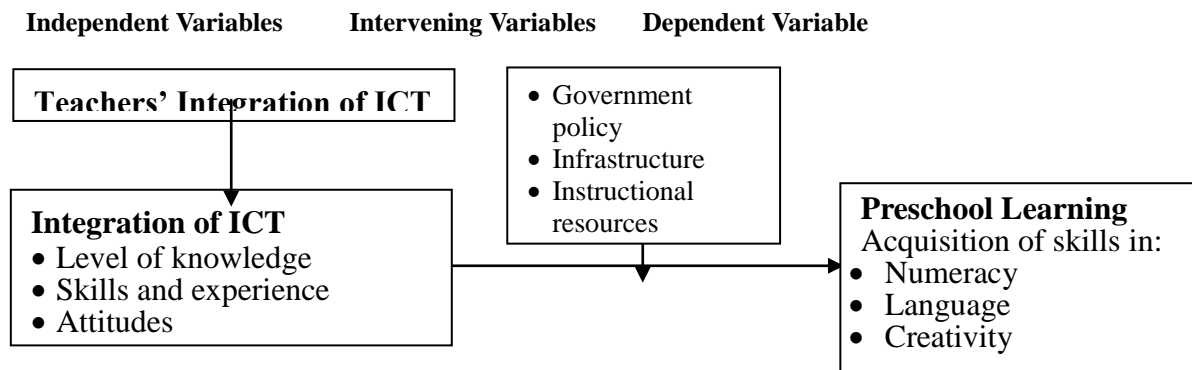


Figure 1: Conceptual framework showing how integration of ICT in teaching influence acquisition of basic numeracy, language and creativity skills

Objective

To establish the influence of teachers' instructional practices of integrating ICT on preschool learning in Kiambu West Sub-county

Research Question

The research question of the study was;

What is the influence of integration of ICT in preschool teaching on children learning in Kiambu West Sub-county?

Research Hypothesis

H₀: There is no statistically significant influence of integration of ICT in preschool teaching on children learning in Kiambu West Sub-county

III. METHODOLOGY

The study applied mixed methods approach, where, both qualitative and quantitative approaches were applied. According to Creswell (2009), in qualitative approach, the researcher relies on the views of participants, asks broad, general questions and collects data consisting largely of statements from the participants (Creswell, 2009). In this case, the researcher described and analyzed these statements based on the objectives of the study. This kind of data was collected using an interview schedule guide, focus group discussion and an observation schedule. At the same time, the researcher adopted quantitative approach.

Concurrent triangulation design was applied in this study since it is single-phase design in which the researcher implements the quantitative and qualitative methods during the same timeframe and with equal weight (Creswell, 2009). This design generally involved the concurrent, but separate, collection and analysis of quantitative and qualitative data so that the researcher may best understand the research problem. The researcher merged the two data sets by bringing the separate results together in the interpretation during the analysis.

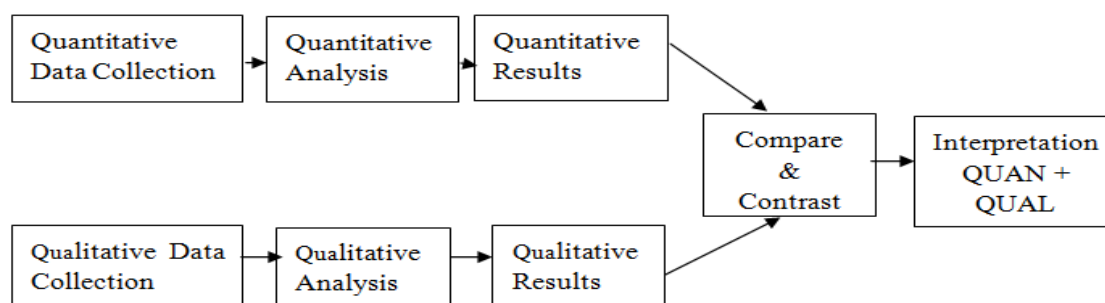


Figure 2. Concurrent triangulation design

Note. Source: Adapted from Creswell (2009)

Using The Central Limit Theorem of sample size determination, a sample of 10 Preschools, that is, 12.5% of the targeted 80 Preschools, was selected. The Central Limit Theorem states that, for any sample size, $N \geq 30$ (N is the sample size), sampling distribution of means is approximately a normal distribution irrespective of the parent population. It thus allows the researcher to select, $N \geq 30$ from the target population (Kothari, 2005). Thus, from The Central Limit Theorem, the researcher sampled 86 respondents, that is, 16.96% of 507. The researcher applied stratified sampling to create 5 strata based on the number of zones in Kiambu West Sub-county.

From each stratum, 2 head teachers and 11 preschool teachers was nominated using purposive sampling. The inclusion criterion was based on the Preschools which face numerous challenges. Purposive sampling was be appropriate due to the fact that the sampled respondents hold responsibilities as implementers of ECD policies. Four parents' representatives were selected using simple random sampling. This was appropriate since it eliminated bias and favoritism since there were equal chances of inclusion in the sample. This sampling procedure enabled the researcher to realize a sample of 10 head teachers, 56 Preschool teachers and 20 parents' representatives

Piloting of research instruments was conducted amongst 4 preschool teachers from 2 preschools in Kiambu West Sub-county since it has members of the relevant population, but not on those who formed part of the final sample. The purpose of piloting was to check on suitability and the clarity of the questions on the instruments designed, relevance of the information being sought and the language used and to test the reliability and validity of the instruments. The respondents who participated in the piloting of instruments were not included during the actual data collection.

Questionnaires were used for collection of data from preschool teachers. This was relevant since according to Morse (2000), a questionnaire consists of a series of questions and other prompts for the purpose of gathering information from respondents and is often designed for statistical analysis of the response. The researcher applied a self-designed questionnaire with close-ended test items to collect quantitative data from Preschool teachers. The questionnaire was divided into two parts. The first part consisted of information on respondents' Bio-data, while the second part contained Likert type of questions based on the research objectives. The researcher also used structured interviews with open-ended test items to collect qualitative data from head teachers where the researcher developed an interview guide with a set of questions on the research objectives. Interviews were important for this study since it enabled the researcher to ask probing and supplementary questions and develop a good rapport with the respondents and a goal-directed attempt by the interviewer to obtain reliable and valid measures in the form of verbal responses from one or more interviewees.

A focus group discussion was used to collect information on perceptions, opinions, beliefs, and attitudes towards a product, service, concept, advertisement, idea, or packaging of parents' representatives. Questions are asked in an interactive group setting where participants are free to talk with other group members. The researcher divided the sampled parents' representatives (20) into 4 groups each consisting of 5 members. The questions for discussions were drawn from the objectives of the study. Observation Checklist for Preschool Learners was also used in data collection from the learners. This is a data collection instrument where systematic observations are made and results of such observations are recorded (Creswell, 2009). In this study, use of observation checklist was appropriate for gathering information from preschool children based on the objectives of the study.

In order to improve the reliability of the instrument, the researcher, with the help of her supervisors, critically assessed the consistency of the responses on the piloted instruments to make a judgement on their reliability. The reliability of the instruments was established using split-half method where the researcher

administered a set of test items to a group of respondents once and then divided the results into two categories, that is, halves, in odd and even patterns. Computation of the reliability coefficient between the scores of the two halves was carried out using Pearson's Product Moment Correlation Formula. A reliability coefficient, $r = 0.7$ was obtained which indicated that there was high internal reliability.

Ethical Considerations

Ethical considerations in research involve outlining the content of research and what was required of participants, how informed consent was obtained and confidentiality ensured. The researcher undertook to keep private any information given by the respondents that touches on their persons or their private life. The researcher assured the respondents that no private information would be divulged to a third party. The respondent were assured that no identifying information about him or her shall be revealed in written or other communication. Concerning confidentiality, the respondent was assured that the information provided would only be used for the stated purpose and would not be passed to a third party. This was done by signing non-disclosure forms.

The researcher ensured and assured the respondent that his or her individual identity would not be revealed whatsoever. Besides, no identifying information about the individual or the institution would be revealed in written or other communication. This was done by labelling the respondents and not using their real names. The nature and the purpose of the research were explained to the respondents by the researcher. The researcher explained to the respondents the procedure to be followed during the data collection so that they can participate willingly. The raw data collected was filed for easy reference. Once the data was analyzed, computer print-outs were filed while softcopies were stored in storage devices such as CDs and flash diskettes.

Data Analysis

Data was analyzed quantitatively and qualitatively and then merged into one overall interpretation in which the researcher related the quantitative results to the qualitative findings. Frequency counts of the responses were then obtained so as to generate descriptive information about the respondents and to illustrate the general trend of findings on the various variables that were under investigation. Qualitative was analyzed thematically along the research objectives and the basic quantitative data was analyzed descriptively using frequencies and percentages and inferentially analyzed using Pearson's Product Moment Correlation Test Analysis in Statistical Package for Social Science (SPSS V23).

Since the study involved concurrent triangulation design, the separately, but concurrently, collected data was analyzed quantitatively and qualitatively and then merged into one overall interpretation in which the researcher related the quantitative results to the qualitative findings. Frequency counts of the responses were then obtained so as to generate descriptive information about the respondents and to illustrate the general trend of findings on the various variables that were under investigation. Qualitative was analyzed thematically along the research objectives and the basic quantitative data was analyzed descriptively using frequencies and percentages and inferentially analyzed using Pearson's product moment correlation test analysis by use of Statistical Packages for Social Science (SPSS Version 23). The quantitative findings of the study were presented using tables whereas qualitative findings were presented thematically and in narrative forms.

IV. FINDINGS AND DISCUSSION

The study established that majority of preschool teachers in Kiambu West Sub-county are not prepared for integration of ICT in the school curriculum. This lack of preparedness on the part of teachers in preschools to adopt modern approaches to teacher and teacher preparation poses a major challenge to efficient

learning to child using modern and innovative means. The study further established that teachers' instructional practices for integration of ICT enhance learning in preschools. It is evident that most preschool teachers do not keep records of learners' progress using computer generated hard copies. This is indicative of the fact that there is poor utilization of ICT integration in preschool and that there is still a long way to go before some schools and some teachers are able to use computers as effectively and efficiently for learning. Preschool teachers rarely record learners' presentations using cassettes drives (CDS) nor do they record their teaching for reflection and revision using cassette drives (CDs) which is indicative of the fact that teachers are not very prepared to use e-learning technologies for learning.

It is also evident that most preschool teachers do not share recorded digital lessons with colleagues to enhance interactive reading and create interactive classes. This points to the fact that, with a view to increasing the instructional practices of pre-service teachers to use ICTs, suggest that teacher educators need to focus on teacher thinking and teacher beliefs to facilitate changes in the teaching-learning process including sharing. Most preschool teachers demonstrate manipulation of apparatus such as the abacus using digital video discs (DVDs) images nor do they demonstrate life skills using projected slides such as how to treat strangers. Most preschool teachers do not prepare schemes of work or plan their lessons using ICT. The instructional practices of pre-service teachers to use ICTs, suggest that teacher educators need to focus on teacher thinking and teacher beliefs to facilitate changes in the teaching-learning process. Further, teachers' attitudes and beliefs have a significant influence on teacher behaviors, and consequently their instructional practices to use ICTs for scheming and lesson planning during learning and teaching.

Most preschool teachers do not use projectors to make presentations such as to explain complex instructions to ensure learners' comprehension nor do they store numeracy and literacy learning content in flash discs like educational computer games. These findings attest to the fact that it is important for teachers to acquire professional experience placements in the preparation of teachers for the effective use of ICTs in their teaching. Most preschool teachers do not present musical compositions using video recordings such as simple children's songs nor do they use video recordings to present visualizations and graphical representations of abstract concepts like number puzzles and demonstrate drills in physical education like gymnastics. Thus, this indicates that most of the preschool teachers do not have the needed experience in the use of computer, do not have needed competence in basic computer operations and needed skills and knowledge in the use of common computer software.

Most preschool teachers do not enhance interactive and collaborative learning through computer simulations such as market behavior and work done by different people in the community which points to the fact that the development of skills and knowledge in the use of ICTs is increasingly deemed to be an important aspect of preparation for participation in an information society, as is the use of ICTs to enhance the quality of learning and teaching in classrooms. In the same vein, preschool teachers do not ensure learners get opportunities to practice using ICT devices such as the computer and projectors. These findings hence affirm the fact that only a few teachers use computers for administration purposes and learners are not involved. Therefore, preschool teachers are not prepared for the integration of technology in the school curriculum which continues to be a complex and challenging process. In other words, seamless integration of computers in learning is yet to be achieved.

From these findings, it is evident that there are unsatisfactory results regarding computer integration in preschools with most teachers not very prepared to use e-learning technologies for learning to enhance syllabus coverage, mastery of content and learners' academic performance. Teachers who have often infused ICT in their preparation of schemes of work and planning their lessons have, on average, had their learners register fair grades in basic numeracy, language and creativity skills. Besides, the increasing the instructional

practices of teachers to use ICT in scheming and lesson planning have facilitated changes in the teaching-learning process.

V. CONCLUSION

The study concludes that teachers' instructional practices need integration of ICT skills in order to enhance learning in preschools. It is also evident that most preschool teachers do not keep records of learners' progress using computer generated hard copies confirming that there is poor utilization of ICT integration in preschools in the sub-county. It is also evident that teachers' instructional practices for integration of ICT where applied enhance learning in preschools. It is evident that most preschool teachers do not keep records of learners' progress using computer generated hard copies. This has confirmed that there is poor utilization of ICT integration in preschool and that there is still a long way to go before some schools and some teachers are able to use computers as effectively and efficiently for learning.

Recommendations

The study recommends that teachers need attend ICT courses in order to acquire pre-requisite skills necessary to effectively infuse Information Communications Technology in the learning process. Instructional practices that integrate ICT in learning demand that, the preschool teachers need to effectively infuse ICT in the normal learning process. The Ministry of Education should enforce the regulations which require teachers to be ICT compliant and this should go a long way in organizing and facilitating teachers' in-service training whose content should focus more on ICT skills.

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