

## **Reliability of Digital Literacy Scale on Academic Performance of Pre-service Teachers in Early Childhood Caregivers in Ojo LGA, Lagos State**

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### **Abstract**

The study investigated reliability of digital literacy scale on academic performance of Pre-service teachers in Early Childhood in Ojo, LGA, Lagos State. The objective of this work was out to determine the effect of digital literacy training on academic performance of pre-service teachers as 2x2 schematic design of true-experimental research design was adopted to randomise participants. The study was carried out among pre-service caregivers in Lagos State University of Education, LASUED. Target population comprised of 200 level undergraduates of sixty participants selected sample (30 experimental and 30 control group participants). Purposive sampling technique was used to select participant. An adapted 15-item 2022/2023 First Semester Achievement Test on Educational Technology and another adapted 15-item on Digital Literacy Scale (DLS) a 3-point scale instrument was used for data collection. Content validity was ensured through the use of Cronbach alpha, a reliability index of 0.864 and 0.890 was derived, meaning that the instruments are suitable for use and t-test statistics was used to analyse the data. The study revealed that participants in the experimental group performed better than those in the control group due to effective training and exposure given to them, hence, all null hypotheses rejected and alternative retained. The study concluded that the adapted digital literacy scale remains a reliable instrument for the improvement of academic performance of students. Among others the study recommended that Digital literacy training should be extended to students in public secondary schools.

**Key Words:** Academic performance, Reliability, Digital Literacy, Achievement, Technology

### **Introduction**

The impact of digital technology cannot be under estimated in the school system owing to numerous positives associated with effective classroom activities and exposure. A student will find the classroom interactive and interesting when instructions are delivered through to digital platform, the 21st century tool for academic advancement. Teaching activity is expected to be expository, mind/eye-opening, informative, educative and entertaining since teaching is backed by technology. Because teaching must follow the sequence of simple to

complex, known to unknown, physical to abstract, therefore it becomes imperative that teaching must be backed by the use of technology (Khodabandeh, 2022).

The concept of digital technology is often considered to include the use of electronic gadgets such as handsets, electronic toys, robots, SMART boards and cards, video machines, projector, applications as Zoom, WhatsApp and the use of internet for information dissemination to enhance effective teaching and learning in schools (Obiweluzo, Onwurah, Oraelosi, Uzodinma, & Dike, 2021). Digital technology tools, resources, systems and gadgets help in data generation, storage and processing for future use. The easy access to Information and Communication Technology ICT, have transformed every aspect of human existence particularly in the area of teaching and learning. In reality if children must survive and succeed with the increasing roles of digital technologies required in this fourth industrial revolution era that has significantly become part of our culture at home, immediate environment, school digital learning must be seen as an integral part of learning in school curriculum of teacher training institutions. According to a study by Morrison (2012) it highlighted some commonly used digitally used techies in education to include computers, educational robots, mobile devices such as Smart phones and Tablets, Smart boards, internet, cameras, iPhones, iPads, digital cameras, online games, social media, mobile phones multimedia among others supported by Apps.

The term digital literacy stems from exposure, enlightenment, education, critical thinking, content mastery and assimilation. Digital literacy most times flows well among children whose hearts are still fragile and exposed to innovations. Scholars have advocated that early childhood education is an education given to children below five years old. NERDC (2017) on its own part views early childhood care or early childhood education as initial stage of organised instruction designed primarily, to introduce young children to a school-type environment. It serves as a bridge between the home and a school-based atmosphere. Federal Republic of Nigeria in her National Policy on Education (FRN, 2019) conceptualise it as education given to children in an educational institution prior to their entering into primary school. Children at this level of education are digital natives. Obiweluzo, et al (2021) asserts that children born into a digital world where the web, podcast and Google are basic vocabulary words require a high level of engagement in their learning to survive and succeed. They read, write and think digitally. Thus, provision of digital technology in the

classroom is vital to support teaching and learning of science engineering and technology activities.

According to Cirfat, Katniyon and Duguryil (2022), the incorporation of digital technology encourages active learning, knowledge construction inquiry and exploration. These devices make it easier for remote communication as well as data sharing to take place between teachers and learners in different physical classroom locations (Katniyon, 2016). Obiweluzo, Onwurah, Oraelosi, Uzodinma & Dike (2021) affirmed that the general use of technology in classrooms increases motivation, improvement in self-concept, mastery of basic skill, enhancement of learner-centred learning and engagement in the learning process. Digital technology can also be used as a scaffolding tool in the early childhood classroom. For instance, digital cameras can be used to create literacy activities for the children. These digital cameras can also be used to document children's learning; daily documentation, wall displays, portfolios (Khodabandeh, 2022). They can be used to create electronic books, child-created books, among others. Digital technology enables children to use Google Earth, an online resource to virtually visit a location they have been learning about. Integrating technologies in learning puts a great role on the teacher as he plays a critical role in the effective use of digital technologies in early childhood classroom.

Competence refers to teachers' knowledge, skills and attitude in using digital literacy and equipment to deliver on classroom learning outcomes. Teachers' competence in the use of digital technologies involves the ability to utilize presentation skills, educational robotics skills, internet usage and all other digital related skills effectively to perform various activities inside and outside the classroom. Early childhood school teachers need the competencies pertinent for the effective use of digital technology in a play based manner in the classroom to allow children to be able to perform tasks, solve problems, communicate, collaborate as well as to create and share contents towards encouraging critical thinking in children.

One of the key competencies needed by teachers in classroom situation include digital presentation skills, educational robotics skills and internet usage skills. Presentation skill is an essential skill in teaching and learning, especially when using computer. Presentation skills include content of subject matter as well as flow of presentation. Information can be presented using zoom, WhatsApp, Google classroom and Power Point projectors. With digital technology,

concepts that are difficult to explain, can be easily presented to the children in a simple way using any presentation software with audio, video and other animations to further aid understanding. PowerPoint presentation can be used to promote emotional intelligence of children, social competence, and curriculum implementation, among others. It affords a teacher the opportunity to incorporate visual and auditory aspect to presentation. It allows variety of manipulations by editing or text modification, removal of existing slides and addition of new slides to make lesson more organised and flexible (Gambari, Yusuf and Balogun 2015).

One important and globally relevant digital learning tool is the internet. Internet is network of global computers interconnected to each other and available to any individual. Uses of the internet includes communication, teaching and learning and dissemination of information, basic processes, operating system basics, software installation from removable, media, step by step downloading software, creating the upload page, create or open a web among others.

However in the teaching and learning environment, the use of digital technology has impacted positively on the performance of learners. Udofia (2023) described academic performance as academic outcomes that indicate the extent to which a learner has achieved specific learning goals. Udofia stressed that academic performance can also refer to completing educational benchmarks such as moving from a lower state to higher one and obtaining a certificate. Performance is often measured through examination or continuous assessment. Since performance is dependent on the degree of content mastered, teachers and other stakeholders are brainstorming on the various facets digital technology can be best maximised in the improvement of academic performance of pupils.

### **Statement of Problem**

A growing trend today is that children have become technologically exposed daily in areas such as gaming, play toys, phones, laptops, and computers, television, and videos at home and outside the home. Sadly, most teachers especially those teaching at the early childhood levels may not be digitally literate (Obiweluzo, et al. 2021). Early childhood school teachers may appear to lack the prerequisite skills towards internet usage, Apps presentation, Internet of Things (IOT), use of packages among others. It is unclear if most teachers lack the competencies in the use of information technologies to procure,

process, store, print and retrieve information from computers and internet. Previous study by Palaiologou (2016) asserted that early childhood teachers may lack Information and Technology knowledge which are needed to enhance use of digital technology. This knowledge if not well utilised may affect academic performance. It is against this background that this study seeks to investigate the reliability of Digital Literacy Scale on Academic Performance of Early Childhood Caregivers especially among pre-service teachers in Ojo LGA of Lagos State.

### **Objectives of the Study**

The study seeks:

1. To investigate the effect of digital literacy training on academic performance of pre-service teachers by pre-post test in experimental group.
2. To identify the effect of digital literacy training on academic performance of pre-service teachers by post-test experimental control groups.

### **Hypotheses**

The hypotheses of the study:

1. Digital literacy training does not have any significant effect on academic performance of pre-service teachers by pre-post test in experimental group.
2. Digital literacy training does not have any significant effect on academic performance of pre-service teachers by post-test experimental control groups.

### **Significant of the study**

1. Academics in tertiary institutions would find this study useful as it affords them the opportunity to determine the appropriate digital literacy scale suited for students in tertiary institutions.
2. Researchers on their own part would find this study relevant as it would aid in contemporary update of information needed in the area of digital literacy.
3. Measurement and evaluation practitioners would also find this work useful as it will guide them in evaluation of digital literacy.
4. Caregivers will find the outcome of this work useful because it would encourage them to intensify the use of digital literacy

mode to teach children in classrooms. This action would also prompt parents to provide children with tech friendly apps that encourage learning.

## **Methodology**

The study adopted true-experimental research design. This design type is used when the researcher has the ability to randomise participants, manipulate and control outcome of behaviours in a study. Experimental and control groups was formed for this study. A 2x2 Schematic type was used for the study as represented below:

E1: O11 X1 O12 (Pretested group with treatment)

C2: O21 O22 (Control group without treatment)

\*Where O11, O21 → represent Pre-test measures

O12, O22 → represents Post-test measures

X1 --- represents Treatment conditions.

The study was carried out among pre-service caregivers in the Lagos State University of Education, Epe campus of LASUED. The population of the study was all undergraduates in same institution while the target population comprised of 200 level undergraduates. Two sampling technique comprising of purposive and simple random techniques were used to select participant. They were seen as the best technique to use because they captured the appropriate participants meant for the work and also gives every participant an equal chance of been selected for this study. First, purposive sampling technique was used to identify Pre-service teachers from Department of Early Childhood Care Education, in College of Specialised and Primary Education, COSPED, thereafter simple random sampling technique was used to select a sample size of sixty participants for this work. 30 participants formed experimental group and another 30 form control group respectively. This technique gives every participant an equal opportunity of been selected for the study. An adapted 15-item 2022/2023 First Semester Achievement Test on Digital Literacy Education (15-FSATDLE) from University of Benin, Benin City and another adapted Digital Literacy Scale (DLS) by Denis, et al. (2010) a 3-point scale instrument. This scale was adapted from 21-items to 12-items format in relation to the level of participants. Two academics in the department of Educational Technology, Lagos State University of Education, Ijanikin, Lagos state, determined the validity of the

instrument as content validity was met. Through the use of Cronbach alpha, a reliability index of 0.864 and 0.890 was derived, meaning that both instruments are suitable for use. Z and T-score was used to transform data from the scale to allow for normality. However, the experimental group was exposed to a treatment measure of instruction or training that would assist them in effective manipulation of technology use in two weeks. Interaction with the experimental group took place once every week for two weeks. The control group was exposed to a general talk on classroom interaction (Dummy). T-test statistics was used to analyse the data and tested at significant level of 0.05 respectively.

## Results

**H<sub>01</sub>:** Digital literacy training does not have any significant effect on academic performance of pre-service caregivers by pre-post test in experimental and control group

**Table 1:** Effect of digital literacy training on academic performance of pre-service caregivers by pre-post test in experimental group

Groups	X	SD	P-val.	t-cal.	Sig.	Remarks
Pre-test	2.49	0.69	0.05	1.99	0.006	Reject H <sub>01</sub>
Post-test	3.37	0.74				

**Source:** Research Work, 2024

From the data above it is observed that the pre-test group recorded a lower mean and standard deviation values as against that of post-test group. With t-cal. value of 2.96, P-value > 0.006, hence the null hypothesis formulated is rejected and alternative hypothesis which states that digital literacy training has a significant effect on academic performance of pre-service caregivers in experimental group.

**H<sub>02</sub>:** Digital literacy training does not have any significant effect on academic performance of pre-service caregivers by post-tests in experimental and control groups

**Table 2:** Effect of digital literacy training on academic performance of pre-service caregivers by post-tests in experimental and control groups

Groups	X	SD	P-val.	t-cal.	Sig.	Remarks
Post-test (Exp)	3.14	0.525	0.05	3.09	0.017	Reject H <sub>02</sub>
Post-test (Con)	3.79	0.831				

**Source:** Research Work, 2024

From Table 2 above, it is observed that the post-test (experimental) group recorded a higher mean and standard deviation values as

against that of post-test (experimental) group. With t-cal. value of 3.09, P-value > 0.017, hence the null hypothesis formulated is rejected and alternative hypothesis which states that digital literacy training have a significant effect on academic performance of pre-service caregivers in post-test experimental control groups.

## **Discussion**

From the one it reveals that digital literacy training has significant effect on academic performance of pre-service caregivers by pre-post test in experimental group. It is expected that a well developed training package would expose pre-service teachers to improvement in actions. Due to the exposure of students to sets of developed training programmes on how to maximise digital platforms effectively either in the area of Apps manipulation and effective utilisation in classrooms or for teaching purposes, their performances are expected to improve. This study conforms to that of Obiweluzo, et al. (2021) who affirms that the general use of a carefully planned digital technology activity in classrooms have the likelihood to increase motivation, improvement in self-concept, mastery of basic skill, enhancement of learner-centred learning and engagement in the learning process. Since digital technology or digital literacy can be used to enhance scaffolding mastery and manipulation at a early stage in life, it also have the probability of functioning efficiently in classrooms.

Meanwhile hypothesis two reveals that digital literacy training have a significant effect on academic performance of pre-service caregivers especially in post-test experimental control groups. It is an expectation that the effect of a training package would be carefully observed by way of outcome condition. The study upholds that due to enlightenment and planned activity of training, academic performance of students is bound to experience a systematic change and expectation as seen in the experimental group. The intervention of any sort and manner is bound to be seen on the academic performance of stakeholders and students respectively. The outcome of this work conforms to that of Cirfat, Katniyon and Duguryil (2022) alongside Katniyon (2016) claimed that the incorporation of digital literacy skills encourages active learning, knowledge construction inquiry and exploration. These devices make it easier for remote communication as well as data sharing to take place between teachers and learners in different physical classroom locations. Against all odds it increases motivation, improvement in self-concept, mastery of basic skill,



enhancement of learner-centred learning and engagement in classroom learning process.

### **Conclusion**

Having advance the role played by reliable digital literacy scale on academic performance of early childhood caregivers especially in Ojo local government area, the study concluded that digital literacy skill remains a functional tool in the 21st century that can be used to enhance academic performance of early childhood caregiver trainees in the state. The study also concludes that use knowledge on the use of digital literacy goes a long way to aid content assimilation, mastery and development of critical thinking skills.

### **Recommendation**

Digital literacy entails the knowledge acquired through ones' interaction with technology. The study among others recommended the following after rigorous study:

1. Digital literacy training should be extended to students in public secondary schools
2. Teachers should be exposed to the techniques in test development especially as it concerns digital literacy content.
3. Digital literacy should be made compulsory for all undergraduates in tertiary institution.

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