

To cite this article: Mulaa Victor, Elizabeth Katam and Samson Ikinya Kariuki (2025). TEACHERS' DIGITAL LITERACY KNOWLEDGE AND SKILLS ON INTEGRATION OF DIGITAL LITERACY IN EARLY YEARS EDUCATION IN PUBLIC PRIMARY SCHOOLS IN NAKURU COUNTY KENYA, International Journal of Education and Social Science Research (IJESSR) 8 (4): 429-438 Article No. 1130, Sub Id 1750

TEACHERS' DIGITAL LITERACY KNOWLEDGE AND SKILLS ON INTEGRATION OF DIGITAL LITERACY IN EARLY YEARS EDUCATION IN PUBLIC PRIMARY SCHOOLS IN NAKURU COUNTY KENYA

Mulaa Victor¹, Elizabeth Katam² and Samson Ikinya Kariuki³

¹Department of Educational Management, Policy & Curriculum Studies,
School of Education, Kenyatta University P. O. Box 43844-00100 Nairobi Kenya,

²Department of Educational Management, Policy & Curriculum Studies,
School of Education, Kenyatta University P. O. Box 43844-00100 Nairobi Kenya,

³Department of Educational Management, Policy & Curriculum Studies,
School of Education, Kenyatta University P. O. Box 43844-00100 Nairobi Kenya,

DOI : <https://doi.org/10.37500/IJESSR.2025.8430>

ABSTRACT

Digital literacy is one of the elemental skills in a Competence-Based Curriculum (CBC), which should be integrated across all learning activities. This paper explores teacher's digital literacy knowledge and skills in the ongoing integration of digital literacy as a core competency in the early years of education in public primary schools in Nakuru County. The study objective was: to determine teachers' digital literacy knowledge and skills influencing the integration of digital literacy in early year's education, correlation research design was used. A sample of 157 teachers and 16 Headteachers were involved in this study. Questionnaires and observation schedule were used to collect data. This study found that a teacher's digital literacy knowledge and skills greatly influence the integration of digital literacy. This study also recommended that the head teachers, teachers and support staff in charge of ICT in schools who have sufficient knowledge and skills in digital literacy should be supported and motivated in order to assist and support other teachers in areas that possess a challenge while integrating digital literacy.

KEYWORDS: Digital Literacy, Digital Literacy knowledge and skills, Competence-Based Curriculum Integration

INTRODUCTION

Implementation of the Competency-Based Curriculum (CBC) requires teachers to integrate digital literacy across all the learning areas. Therefore, teachers' digital literacy knowledge and skills is very vital as teachers with digital literacy knowledge and skills are aware of the outlook on digital evolution, its significance, and the purpose of digital tools in education [3]. Developing teachers' digital literacy knowledge and skills to integrate digital literacy means going beyond functional skills

and the ability to complete basic internet searches and power point presentations. It involves authorizing teachers to utilize a broad range of technologies collectively, innovatively, and analytically during teaching to enable learners to emulate the same [6]. A teacher who has digital literacy knowledge and skills can utilize digital resources to integrate digital literacy to achieve competence in each learning area thus in the process develop learners' digital teaching materials and digital tools.

The Kenyan government made efforts to promote digital literacy integration in primary schools through programs such as the Digital Literacy Program (DLP) in 2016 and the laptop project. Despite the government equipping schools with digital devices and training teachers on digital literacy, the percentage of adept teachers stood at 36% implying that out of three teachers, only one was within the basic requirement of a digitally literate teacher. Hence the need to investigate teacher's digital knowledge and skills on integration of digital literacy in the early years of education in public primary schools in Nakuru County Kenya.

Theory of the study

The foundation of this work is built on Gross Theory (1971). The curriculum implementation theory by Gross (1971) postulates the success of an instructional program, components like teacher ability, lucidity, and awareness, together with knowledge and skills are important. Also, support from the administration, teachers' attitudes, and students together with collaborators' attitudes should be regarded highly. Gross (1971) states that the teacher must be competent and knowledgeable of the content to be integrated.

Background of the study

In Kenya's CBC curriculum, digital literacy comprises basic computer skills and literacy [5] therefore; to enhance digital literacy, attention needs to be set to the development of infrastructure and digital skills. For teachers to be in a position to integrate digital literacy, they need to have a firm foundation in basic Information Computer Technology (ICT) and computer knowledge and skills. Digital knowledge and skills rely upon teachers' capacity in shaping instructional surroundings within modern approaches, by integrating digital literacy into pedagogy. Which calls for a different set of class-handling abilities to be developed. In Greece, teachers claimed they needed more training and seminars even though they integrate digital literacy and use digital devices in teaching and trust that these ease teaching and assist learners [14].

In Poland majority of the teacher's integrated digital literacy by combining it with traditional teaching methods, other teachers suggested the need for more training and low-frequency training for in-service teachers [14]. Lack of training, knowledge, and skills is also mentioned by [18]. In South Sudan, missionary and private schools were supported by organizations and were more likely to have digital devices and resources in schools, but lacking in public schools, even in public schools in urban

areas. The aim was to retain teachers and maintain the education programs running due to budget constraints and security fears [15].

[1] findings proved that the majority of teachers are not competent in digital literacy based on the standards of a digitally literate teacher. It was discovered that teachers generally do not advance in digital education because of a lack of prior knowledge, a severe lack of training, and a gap in experience, just like in any other research that was presented. Although the majority of teachers have a positive attitude toward digital literacy and a solid understanding of its fundamentals, those teachers pointed out that they lacked the cognitive ability to gather information, generate it, evaluate it, and transmit it, all of which are crucial elements of digital literacy, when confronted with open-ended questions [19].

Based on a study conducted by [20], teachers shy away from discussing digital literacy and digital devices due to their insufficient knowledge, skills, and confidence. But if teachers' capacity is fully developed, they will be in a position to confidently integrate digital literacy into their pedagogy. The basic foundation of being digitally literate is first acquiring some ICT skills combined with basic computer skills. A study conducted by [9], discovered many teachers who have served a lengthy period were not knowledgeable about the integration of digital literacy in teaching and learning. Their research findings showed many of them had insufficient basic ICT skills which is the basis for developing digital literacy.

It posed a great challenge to integrate digital literacy in early years' education in public primary schools in Nakuru County since teachers lacked basic ICT skills. According to [5], digital literacy involves the integration and creation of digital ways, retrieving and preparing information, and contributing to public webwork through integrating an extensive array of computing skills [5]. Therefore, a teacher's confidence in the integration of digital literacy is key [16].

The digital literacy program was introduced in Kenya before the CBC and primary schools were provided with tablets. But the usage stood at 2 per cent [11]. The CBC program which was introduced in 2016, could have been the best foundation for developing teachers' capacity to integrate digital literacy in Kenya. The program aimed to improve primary school learners by way of employing digital devices [10]. Its successful implementation depended on the teacher's capacity to productively integrate digital literacy to promote student learning. However, studies conducted on the program showed that teachers' capacity was never or not fully developed thus making the teaching of digital literacy as a core competence in the CBC a challenge. KICD's [11] report on CBC activities indicated that 61% of teachers cannot integrate digital literacy. This shows integrating digital literacy in CBC may not be fully realized hence made this study appropriate.

STATEMENT OF THE PROBLEM

The Kenyan government made efforts to promote digital literacy integration in primary schools through programs, such as the DLP in 2016 and the laptop project. Despite the government equipping schools with digital devices and training teachers on digital literacy, the percentage of adept teachers stood at 36% meaning that out of three teachers, only one was within the basic requirement of a digitally literate teacher. Hence the need to investigate teachers' digital literacy knowledge and skills to integrate digital literacy in the early years of education in public primary schools in Nakuru County Kenya.

RESEARCH OBJECTIVE

The objective of the study was: To determine teachers' digital literacy knowledge and skills influencing the integration of digital literacy in early years' education in public primary schools in Nakuru County.

RESEARCH HYPOTHESIS

The null hypothesis at a 0.05 level of significance guided this study:

H₀₁: Teachers' digital literacy knowledge and skills have no statistically significant association with digital literacy integration in early years' education in public primary schools in Nakuru County.

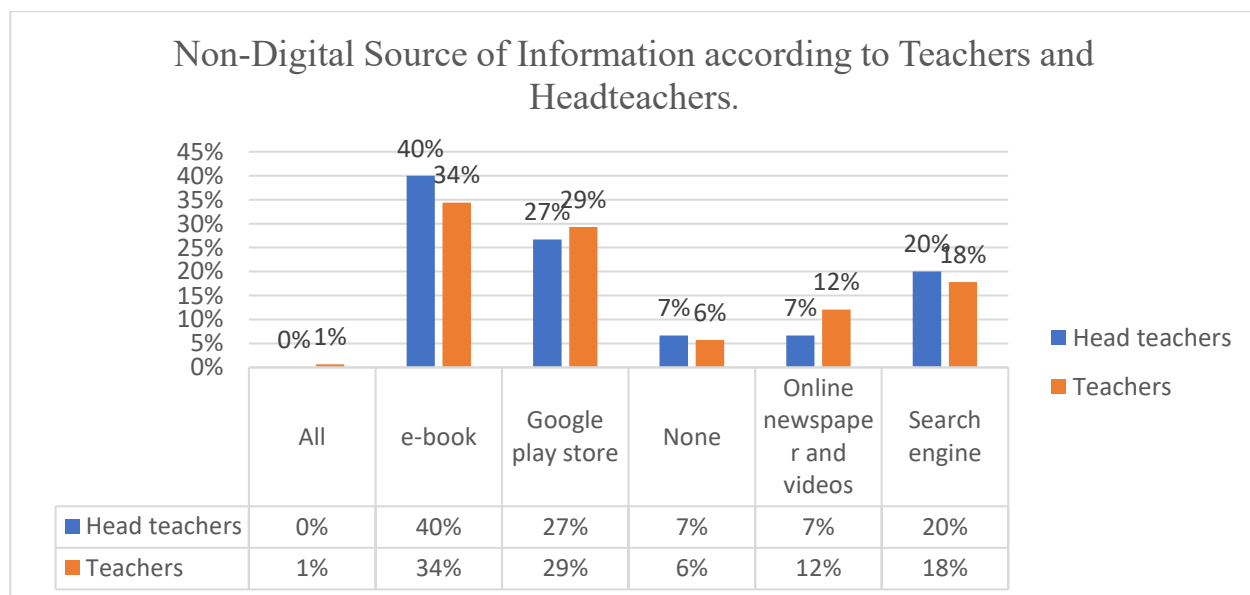
METHODOLOGY

The study adopted a correlation research design. A sample of 157 teachers and 16 Head teachers were involved in this study. Questionnaires and observation schedule were used to collect data. Quantitative data was analyzed and the results were presented in themes while qualitative data was analyzed using descriptive statistics such as means and percentages and Pearson moment correlation inferential statistics. Findings are presented using graphs and charts.

FINDINGS AND DISCUSSION

The objective was to determine teachers' digital literacy knowledge and skills influencing the integration of digital literacy in early years' education in public primary schools in Nakuru County. To determine the extent to which digital literacy knowledge and skills influence the integration of digital literacy, a questionnaire which had a close-ended question and a Likert scale ranging from strongly agree to strongly disagree was administered to both head teachers and teachers. Both the head teachers' and teachers' questionnaires had statements on digital literacy knowledge and skills. The items were scored on a five-point rating scale. SA (Strongly agree), A (Agree), UD (Undecided) D (Disagree) SD (Strongly disagree). The weighting of options for positive connoted items were SA=5, A=4, UD=3, D=2, SD=1, while for negatively connoted items were: SA=1, A=2, UD=3, D=4, SD=5. The results are presented in the tables and figures.

Figure 1:1: Digital sources of information according to head teachers and teachers.



Source: Research Data (2023)

Head teachers and teachers were asked to choose a non-digital information source according to figure 1:1. The majority of the head teachers 40% and 34% of teachers choose e-books as a non-digital information source. This shows that the majority of the head teachers and teachers lack enough knowledge of digital literacy and digital technologies hence, CBC will fail to attain its goal of digital literacy in early years education level. An e-book is a digital source of information. The non-digital source of information according to question was the Google Play Store.

Also 65% of the head teachers and 63% teachers were comfortable in integrating digital literacy however; there is still 19% of head teachers and 17% of teachers that were not comfortable while 19% of head teachers and 18% of teachers were not sure if they are comfortable, hence retooling and motivation is needed to enable them to be confident to integrate digital literacy. This shows teachers are willing to integrate digital literacy but the unavailability of enough digital resources and materials affects the integration of digital literacy.

Headteachers and teachers were asked to indicate the source of information they used during teaching. A majority of the head teachers and teachers still rely on textbooks which take time to be updated,

unlike online resources. This shows most of them might not know how to fetch relevant information or digital material for their lesson online therefore, learners will not be able to acquire digital literacy as one of the core competences of CBC since teachers themselves are unable to integrate digital literacy. However, there is a good number of head teachers and teachers who can use both information from the textbook and relevant information from the internet.

The Input devices available in school according to head teachers and teachers, the majority of the head teachers and teachers choose the printer as an input device; this shows both teachers and head teachers lack sufficient knowledge and skills in digital literacy and digital technologies. Since a printer is an output device. There were still those who selected a television set which is also an output device. Input devices are those devices used to key in data or a command such as a mouse, keyboard and touch screen. It was also noted that, only 6% of the head teachers and 11% of the teachers were comfortable using both the projector and laptop in class together with their smartphones and the tablets that was provided by the government. This clearly shows that the integration of digital literacy in the early years' education level is not being implemented.

Table 1:1: Teachers' digital literacy knowledge and skills influencing the integration of digital literacy, frequency and percentage.

Table 1:1 below indicates the results of teachers' digital literacy knowledge and skills influencing digital literacy integration in early-year education.

Items	SA	%	A	%	UD	%	D	%	SD	%	Totals	Mean	Standard deviation
I frequently update the digital devices available	20	13%	32	20%	13	8%	57	36%	35	22%	157	2.65	2.49
I find it challenging to access information on the internet	14	9%	21	13%	7	4%	69	44%	46	29%	157	3.71	3.42
I use a password to protect data on a digital device	46	29%	71	45%	8	5%	20	13%	12	8%	157	3.76	3.44
I often update the antivirus on the digital devices	21	13%	44	28%	15	10%	54	34%	23	15%	157	1.91	1.86
I use a short time to assemble the projector in class	14	9%	40	25%	17	11%	43	27%	43	27%	157	2.61	2.46
I can comfortably make my notes in PowerPoint form	19	12%	54	34%	5	3%	53	34%	26	17%	157	1.92	1.89

Source: Research Data (2023)

The majority of the head teachers frequently update the digital devices available in school. 25% strongly agreed, 38% agreed, none was undecided, 25% disagreed and 13% strongly disagreed. The item had a mean of 3.75 and a standard deviation of 3.10 this shows that many head teachers agreed

in taking care of the digital devices. At least there are head teachers having some digital literacy knowledge and skills. When it comes to teachers, the majority of them do not frequently update the digital devices available in school. 22% strongly disagreed, 36% disagreed, 8% were undecided, 20% agreed and only 13% strongly agreed this shows teachers are not aware of the importance of keeping safe digital resources. The item had a mean of 2.65 and a standard deviation of 2.49 this shows how most of the teachers were undecided hence not having sufficient digital literacy knowledge and skills. Safety for digital devices starts by updating the anti-virus this clearly shows how teachers still lack sufficient digital literacy knowledge and skills.

Assembling the projector in class, a good number of head teachers took a short time. 25% strongly agreed, 44% agreed, 6% were undecided, 6% disagreed and 19% strongly disagreed. Among the teachers, it was the opposite. 9% strongly agreed, 25% agreed, 11% were undecided, 27% disagreed and another 27% strongly disagreed. This item had a mean of 3.50 and a standard deviation of 2.18 this clearly shows how most of the head teachers agreed on taking too long to assemble the digital devices. While the teachers had a mean of 2.61 and a standard deviation of 2.46 meaning that the majority of the teachers were undecided. A lesson in the early years of education takes thirty-five minutes and taking too much time to assemble a projector hence, wastes the lesson time. This denies the learners ample time to interact and learn with the digital resources also cited in [7] study which argued that some teachers failed to integrate digital literacy since they lacked ample time to learn and interact with digital devices and resources before being expected to integrate them into the classroom.

Ho2: Teachers' digital literacy knowledge and skills have no statistically significant association with digital literacy integration in early years' education in public primary schools in Nakuru County. This hypothesis was tested using Pearson's moment correlation at a 5% level of significance.

There was a high positive correlation between frequently updating the digital devices and the use of a custom theme for the entire learning strand among head teachers. The computed R-values of 0.99 and 0.44 are greater than the tabulated R-value of 0.497, therefore, the null hypothesis was rejected. The findings simply imply that teachers' digital literacy knowledge and skills have a statistically significant association with digital literacy integration in early years' education in public primary schools in Nakuru County.

On the other hand, there was a high positive correlation between comfortably making notes in PowerPoint form and customizing templates for different learning strands among teachers. The computed R-values of 0.259 and 0.322 are greater than the tabulated R-value of 0.159, therefore, the null hypothesis was rejected. The findings simply imply that teachers' digital literacy knowledge and skills have a statistically significant association with digital literacy integration in early years' education in public primary schools in Nakuru County.

This study also revealed that most teachers rely on textbooks as a source of information used during teaching. This is a big challenge in the integration of digital literacy since it takes time to update

textbooks unlike online information on the internet or shared information via social media. This shows most teachers still need to be trained and equipped in digital literacy. Since digital literacy is a dynamic competence and not static, every day there are new concepts and challenges to overcome. The study showed teachers still use traditional methods in teaching which concurs with previous studies that were conducted by [14] same findings were concluded in a study done by [18].

According to a study done [6], a teacher whose capacity has been developed should be in a position to frequently update digital devices. However, this study revealed that most teachers do not do that. This shows teachers lack the necessary knowledge and skills in digital literacy. Also, according to [8] a teacher whose capacity has been developed to integrate digital literacy should be able to organize, store and protect information by using passwords to protect information. This study found that most teachers are in a position to protect their information and school information using passwords on digital devices.

The current study also revealed that teachers feared using digital devices in case they broke down just like what [14] study found. Apart from the fear of using digital devices, the classrooms which were built to facilitate the integration of digital literacy were currently being used by junior secondary school learners. Most of the digital devices provided by the government are stored under lock and key.

Most teachers need to be trained in digital literacy even though some of them have already been trained which concurs with a study done in Greece [4] the findings were also similar to a study done by [14] which found out that teachers requested for in-service training that will enable them to productively integrate digital literacy in class.

This study further revealed that teachers lacked sufficient knowledge just as [1] study found. Also based on a study conducted by [20] teachers shy away from discussing digital literacy and using digital resources due to a lack of sufficient knowledge of digital literacy. The findings of the study are also anchored in Gross Theory which states that the teacher must be competent and knowledgeable of the content to be integrated.

The current study found a positive correlation between digital literacy knowledge and skills and the integration of digital literacy. The null hypothesis, H_01 : Teachers' digital literacy knowledge and skills have no statistically significant association with digital literacy integration in early years' education in public primary schools in Nakuru County was therefore rejected.

Recommendations

The head teachers, teachers and teachers in charge of ICT in schools who have sufficient knowledge and skills in digital literacy should be supported and motivated to help and assist other teachers in areas that possess a challenge to teachers in integrating digital literacy.

CONCLUSION

This study revealed that the majority of teachers still rely on textbooks as a source of information used during teaching, and teachers still need training in digital literacy even those who are already trained.

However, there are those who were able to use online digital resources even though the percentage was small. Further, the study found a positive correlation between digital literacy knowledge and skills and the integration of digital literacy.

Empirical evidence for the existence of a significant relationship between teachers' digital literacy knowledge and skills with digital literacy integration in early years' education in public primary schools in Nakuru County. Further, the study found a positive correlation between digital literacy knowledge and skills and the integration of digital literacy.

REFERENCES

- [1] Al-Khateeb, A. A. M. (2017). Measuring Digital Competence and ICT Literacy: An Exploratory Study of In-Service English Language Teachers in the Context of Saudi Arabia. *International Education Studies*, 10(12), 38-51.
- [2] Arikunto, S. (2002). Research Methodology A Proposal Approach. Jakarta: PT. Rineka Cipta.
- [3] Arstrop, A. (2017). *Example title Professional Digital Competence Marijana Kelentri* (Issue May).
- [4] Competency, I. C. T., & For, S. (n.d.). *Policy Framework*.
- [5] Dagnaw, G. A., & Tsigie, S. E. (2019). *CURRENT STAT OF THE ART DIGITAL LITERACY IN ETHIOPIA: ARTICLE REVIEW CURRENT STAT OF THE ART DIGITAL LITERACY IN ETHIOPIA: October*.
- [6] Digital, E., & Skills, L. (n.d.). *Essential Skills Wales Suite*.
- [7] Greene, Kiersten (2018) "Transferable Digital Literacy Knowledge." The Language and Literacy Spectrum: Vol 28: Iss 1, Article 3.
- [8] Gruszczyńska, A., Merchant, G. and Pountney, R. Digital Futures in Teacher Education: Exploring Open Approaches towards Digital Literacy. The Electronic Journal of E-learning Volume II issue 3 2013, (pg 193-is 206) is available online at www.ejel.org.
- [9] Kamaruddin, K., Abdullah, C. A. C., Idris, M. N., & Nawi, M. N. M. (2017, October). Teachers' level of ICT integration in teaching and learning: A survey in Malaysian private preschool. In *AIP Conference Proceedings* (Vol. 1891, No. 1). AIP Publishing.
- [10] Kenyan ICT Authority. (n.d.). *Update on the Digital Literacy Programme Being Implemented By the ICT Authority*. <http://icta.go.ke/update-on-the-digital-literacy-programme-being-implemented-by-the-ict-authority/>
- [11] Khan, A. G. A., & Foundation, K. (2018). *Raising Learning Outcomes: The Opportunities and Challenges Appendix 3 UNICEF Eastern and Southern Africa Region and West and Central Region country snapshots. September*.
- [12] KICD (2018). Report on Competency-Based Curriculum Activities presented to the Nat. Steering Committee: Nairobi: KICD
- [13] Kombo, D. K., & Tromp, D. L. A. (2006). Project and thesis writing: An introduction. *Pauline's Publications Africa*.

- [14] Kontovourki, S., Garoufallou, E., Ivarsson, L., Klein, M., Korkeamaki, R.-L., Koutsomiha, D., Marci-Boehncke, G., Tafa, E., & Virkus, S. (2017). *Digital Literacy in the Early Years: Practices in Formal Settings, Teacher Education, and the Role of Informal Learning Spaces. A Review of the Literature. COST ACTION IS1410*. 74. <http://digilitey.eu/wp-content/uploads/2015/09/WG2-LR-March-2017-v2.pdf>
- [15] Marsh, J., Kontovourki, S., Tafa, E., & Salomaa, S. (2017). Developing digital literacy in early years' settings: professional development needs for practitioners. *A White Paper for COST ...*. <http://digilitey.eu/wp-content/uploads/2017/01/WG2-LR-jan-2017.pdf>
- [16] McCoy, S and S. Lyons, 2018 "Digital Technologies and Student learning" in Mooney, B., (ed), Ireland's Yearbook of Education 2018/2019, pp, 43-48, Education Matters, Dublin.https://issuu.com/educationmatters/docs/irelands_yearbook_of_education_2018/25?e=36219384/66881060.
- [17] Orodho (2009a). Elements of Education and Social Science Research Methods, Kanezja Publisher, Nairobi.
- [18] Plumb, M., and Kautz, K. (2015). Barriers to the Integration of Information Technology within Early Childhood Education and Care Organisations: A Review of the Literature. Presented at the Australasian conference on information systems 2015.
- [19] Vidosavljevic, M. M., & Vidosavljevic, S. T. (2020). *The Importance of Teachers' Digital Literacy. December 2019*, 412–426.
- [20] Yusny, R. (2017). PROMOTING NEW LITERACIES IN SCHOOLS: A proposition to integrate digital literacy in pre-service teacher education. *Jurnal Ilmiah Didaktika*, 17(2), 264. <https://doi.org/10.22373/jid.v17i2.1643>