



## Effect of teachers' lifelong learning behaviours and digital literacy: A literature synthesis

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### ABSTRACT

Effective integration of technology in teaching and learning activities in secondary schools is a reflection of learning capacities and experiences by teachers from previous learning. This paper explores the effect of teachers' lifelong learning behaviours and the achievement of digital literacy. The paper specifically addresses the following objectives: teachers' views on lifelong learning, the benefits of both lifelong learning and digital literacy, and how lifelong learning affects digital literacy in relation to integrating technology into teaching and learning in secondary schools. The paper systematically reviews secondary literature to evaluate teachers' lifelong learning behaviours and its influence on their acquisition of digital literacy skills. Specifically, the focus is on teachers teaching in secondary schools. The paper is anchored on social learning theory developed by Albert Bandura. Approximately 20 research articles met the criteria for inclusion in this analysis. The analysis from the empirical studies has shown that lifelong learning by teachers is critical towards ensuring instructional effectiveness. Findings from developing countries' research have shown that most teachers find themselves far behind in terms of digital literacy, which affects the integration of technology in teaching and learning activities in secondary schools. There is a positive effect of teacher lifelong learning behaviours, digital literacy levels and integration of technology in classroom instruction in secondary schools. It is therefore concluded that teachers' digital literacy competency levels are dependent on their lifelong learning behaviours. It is recommended that teachers should embrace lifelong learning behaviours through acquisition of digital literacy skills, which is key towards integration of technology in their instructional process in schools. Additionally, the government should ensure that secondary schools are properly provided with technological infrastructure facilities to enable teachers with lifelong skills to integrate them into their teaching and learning process. The Ministry of Education also needs to develop and promote lifelong learning policy to enable teachers to reposition themselves with the changing demands in the education sector and realities of the present world.

**Keywords:** Digital, Learning, Lifelong, Literacy, Teachers and Behaviours

### I. INTRODUCTION

Lifelong learning is the idea of re-organising education and extending it beyond formal education (Ng, 2019). Explicitly, formal education consists of the perceived formative age of people and the system of schools and tertiary institutions (Ng, 2023). Further, Debbarma and Shivam (2024) defined lifelong learning as a drive and curiosity to acquire new knowledge (improvement from the existing knowledge) through formal and informal learning experiences. Additionally, lifelong learning is the learning activities conducted with the purpose of developing knowledge and skills individually and socially (Kilic & Kilic, 2022). International Labour Organisation (ILO, 2023) pointed out that lifelong learning composed of activities are undertaken throughout life for the development of competencies and qualifications. European Commission (EC, 2006) defined lifelong learning as all general education, vocational education and training, formal and informal education undertaken throughout one's life.

United Nations Education Scientific and Cultural Organisation (UNESCO, 2025) defined it as incorporating all learning activities which are undertaken throughout one's life to enhance knowledge, qualification and skills for professional, social and personal reasons. From these definitions, it can be deduced that lifelong learning is a continuous process which helps to advance individual's knowledge, competencies and potential through formal and information means in all his/her life. Teachers being implementers of curriculum that keeps on being revised and advanced are expected to have lifelong behaviours to enable them perform their tasks and also produce competent graduates through country's education system. The idea of lifelong learning was initially developed in the early 1970s as an international



agenda by the United Nations Educational, Scientific and Cultural Organization. UNESCO advocated lifelong learning as the need for individuals to learn through life for social, cultural, economic, and personal fulfilment (Ng, 2023).

The purpose of lifelong learning is to make sure individuals can actively participate in all spheres of life without being affected by factors such as social, economic, age, culture, and gender (Kilic & Kilic, 2022). Ng (2023) said that lifelong learning results to improved knowledge, skills, and competencies within a personal, civic, social, and employment-related areas. Lifelong learning aims to facilitate equal and open access to quality of learning opportunities and various learning experiences for individuals of all age groups (Demir et al., 2022). The Republic of Kenya, observed that lifelong learning is necessary to empowering individuals to become self-determined and educated citizens (Ogolla, 2018). The government acknowledges that compulsory basic education alone cannot prepare people for the ever changing global labour market as they, in addition to the formally transferred knowledge, need to obtain more complex skills like confidently performing non-routine tasks, being capable of problem-solving, taking decisions and adapting to the internationalised context. Hence, lifelong learning is therefore a vehicle for the empowerment of individuals, especially those who are out of the formal school system.

In recent times, lifelong learning has been considered a worldwide investment in developing opportunities for all, such that individuals can learn across the whole life span. Sustaining the learning process throughout life is one of the competencies required in the 21st century (Sulak et al., 2022). Information and communication technologies changes has created the demand for teachers to possess digital literacy skills in the present world (Garzón Artacho et al., 2020). Taheri and Pennington (2024) indicated that technology has become essential in 21st-century education, serving as an essential component of learning inside and outside the classroom, enabling teaching and learning (Ahmadi, 2018; Gilakjani, 2017; Wiraningsih & Santosa, 2020).

Teachers should have Digital Literacy (DL) skills and use its techniques to help their students learn how to solve problems in digital environments, given the fast-paced development of digital technologies (Sadaf & Johnson, 2017). Digital literacy is the ability to use the appropriate methods by aiming to access to the right information effectually in real and virtual environments (Leaning, 2019). European Commission defines digital literacy as the ability to identify, understand, express and interpret different ideas by using visual and audio digital materials (European Commission, 2019). The indicator of individuals' being digital literate is their adaptation to emerging and technologies (Ng, 2023). Therefore, digital literacy is the capacity to access new information through utilising digital resources, using them in solving problems and using these technologies safely and effectively (Pala & Başbüyük, 2023). With respect to the teaching profession, high digital literacy of teachers is considered to be an enabler of them achieving the goals of lifelong learning. This paper therefore examines the relationship between teacher digital literacy skills and lifelong learning behaviours.

### 1.1 Problem statement

Pre-service teacher education and training is not producing the expected outcomes in terms of preparing teachers for 21<sup>st</sup> century education skills which is complex, challenging, creative and flexible (Ngure, 2022). This has seen the roles of teachers and schools changing and the expectations from them increasing in recent years. Teachers are expected to integrate digital skills in their instructional learning process in class. However, UNESCO (2020) assessment discovered that most teachers in developing countries (including Kenya) lifelong learning tendencies in digital literacy is low. This prompted the researcher to conduct investigation of status of teachers' lifelong learning behaviours and acquisition of digital literacy skills from review of studies conducted across different parts of the globe.

### 1.3 Purpose of the Paper

The aim of this secondary research paper was to examine and document on teachers lifelong learning behaviours and its influence on teachers' acquisition of digital literacy skills.

## II. THEORETICAL FRAMEWORK

The paper is anchored on diffusion of innovation theory which was developed by Rogers in 1963. According to this theory is the process through which innovation is communicated through certain channels over time (Rogers, 2005, p.5). This theory identifies individuals of a certain social system (in this study teachers) respond to new ideas (here in referring to digital literacy) at various levels of commitment starting from full implementation to complete rejection (Solomon, 2017). The adoption level of a new innovation / idea is dependent on the four factors; the innovation, time, communication channels and social context/ system (Rogers, 2005). Rogers reiterated that for innovation to be adopted, it has to be compatible among a group in a social system and show better advantage where it is seen to have a relative advantage compare to the existing one. The process of innovation starts from the knowledge phase until the final stage or decision on whether to accept or reject innovation. The focus of this paper is on the knowledge stage which includes individual exposure to innovation (digital literacy) and understanding how it operates. Teachers expose them to digital

training to ensure that it aligns with their interests, needs, beliefs and attitudes. At this phase the teacher is away of the digital innovation but he/she has not yet embraced it since due to lack of competencies. It is through learning (lifelong learning behaviour) that compels them to look for this knowledge (Rogers, 2005). This will help the teacher to know how to use innovation well in addition to the principles underlying digitalisation in academic context. Change agents perform a critical role at this stage of innovation since they communicate what digitalisation skills entails and influence teachers in a way that it is acceptable to them and their present and future learning context (El Shaban & Egbert, 2018). Therefore, the agents of innovation play an important role in influencing lifelong learning behaviours by teachers on matters of digital literacy skills in schools a focus of this paper.

### III. METHODOLOGY

The paper is based on qualitative research methodology under desktop review design. This design involves the procedure of extensive analysis, evaluation, and synthesis of information related lifelong learning and digital literacy skills acquisition by teachers. The desktop review involved; searching, scanning, sieving, summarising and writing processes (Galvan & Galvan, 2024). It involved looking for secondary literature from print and online sources with respect to the topic of the paper. The study relied on information from government publications, theses, journal articles, organisation documents and online books. The key words that were used during searching and scanning were; lifelong learning, capacity building, digital literacy, teachers, and training. All documents that had those key words were downloaded, read widely and properly summarised to extract the essential information needed for the paper. Articles that were not essential were omitted and excluded in analysis. The researcher also ensured that articles that were more than 10 years were not included in this study. This resulted to the researchers using 20 articles which were selected and thematically analysed.

### IV. FINDINGS & DISCUSSION

In this era of rapid evolution, education in the twenty-first century must strive to develop students into lifelong learners (Ng, 2023). This can only be accomplished if the teachers possess the required digital literacy skills through lifelong learning process. Various research studies have been undertaken to establish the association between lifelong learning behaviours by teachers and acquisition of digital skills from research conducted from various parts of the world. A study conducted in Andalusia Spain by Garzón Artacho et al. (2020) evaluated development of digital competence among teachers of the lifelong learning stage in the community. Results showed teachers had inadequate competency in the five digital dimensions, especially in the creation of digital content. Research showed that there was direct relationship between previous ICT training and the dimensions of communication and collaboration, and content creation. Further teachers concerned with preservice ICT training were young and with less than 10 years of experience. In Greece, Jimoyiannis and Gravani (2010) explored some aspects of adult learning on digital literacy in the context of a lifelong long learning programme for social cohesion; Second Chance Schools (SCS). Findings revealed that teachers tried to use flexible instructional practices that were adjusted to adult learners' needs and interests. Common effective instructional practices in use were: ICT competence sessions that were performed at the computer laboratory; interdisciplinary and multi-literacy lessons and ICT-based short and long term projects, and individual instruction sessions that were focused on adults' specific needs or difficulties.

In Turkey, Kilic and Kilic (2022) examined the relationship between teachers' lifelong learning tendencies and their attitudes towards technology use in education, and to determine the different variables that affected them. They discovered that teachers' lifelong learning tendencies differed significantly according to gender, level of learning, and frequency of reading materials. It was concluded that teachers' attitudes towards the use of technology in education differ significantly according to gender and education level in some factors. Another study by Demir et al. (2022) sought to establish the relationship between teachers' lifelong learning tendencies and digital literacy levels. It was found out that that lifelong learning behaviour of teachers were at a high level. Besides, teachers find themselves sufficient in terms of digital literacy. It was observed that there was a positive and significant relationship between teachers' lifelong learning tendencies and digital literacy levels. Further, Sulak et al. (2022) examined the relationship between primary school teachers' digital literacy and lifelong learning tendencies. The research sample consists of 153 primary school teachers. findings demonstrated that the digital literacy of primary school teachers is at the "good" level and lifelong learning tendencies at the "strongly agree" level. Primary school teachers' digital literacy does not differ by the variables of gender and educational status; yet differs significantly by age, seniority, and in-service training. Lifelong learning tendencies differ significantly in favour of women by gender; do not differ according to age, seniority, education level, and in-service training. In addition, a moderately positive correlation was found between the digital literacy and lifelong learning tendencies of primary school teachers.



Elsewhere, Keskin (2023) analyses the relationship between lifelong learning tendencies and digital competencies of teacher candidates. It was found out that there was significant moderate relationship between the lifelong learning tendencies scale in general and the competencies of using basic internet tools and the competencies of acquiring and using information in digital environment. Elçi (2024) determined the correlation between teacher candidates' digital literacy levels and lifelong learning tendencies. results show that there was a moderately positive linear relationship between the digital literacy levels of teacher candidates and their lifelong learning tendencies. While the digital competencies and lifelong learning tendencies of teacher candidates differed according to gender and study-year variables, there was no remarkable difference accordingly the year variable. This year, Yilmaz et al. (2025) observed that the rapid growth of technology accompanied new requirements in all aspects of life. the researchers studied the mediating role of digital literacy between teachers' lifelong learning tendency and their 21st-century skills. Findings indicated that participants' lifelong learning tendencies were at a low, but digital literacy and 21st-century skills were at a medium level. Moreover, while lifelong learning tendency directly affects 21st-century skills, ethics and responsibility act as a mediator between lifelong learning tendency and 21st-century skills.

Technology change is a key factor in the change of lifestyles in the society in the 21st century. A research conducted in China by Feng and Ha (2016) indicated that Results showed significant correlations between information literacy and lifelong learning, lifelong learning and school effectiveness, and information literacy and school effectiveness. The effect of lifelong learning is apparent. The results revealed the higher teachers' information literacy, the better teaching efficacy. In such an era when information technology is emphasized, administrative institutes have stressed on the cultivation of teachers' information literacy abilities. A recent study by Qing and Jing (2024) reported that in the context of the digital transformation of education in the new era, digital literacy for teachers is a new requirement for professional development. Teacher digital literacy encompassed four main aspects: attitudinal literacy, knowledge and skills literacy, instructional application literacy, and innovation and development literacy. Currently, there are several issues with teacher digital literacy, such as a lack of digital responsibility, insufficient digital knowledge and skills, weak digital application skills, and low digital innovation capability. Enhancing teachers' digital literacy is a complex and critical task.

In Tripura India, Debbarma and Shivam (2024) explored the effects of lifelong learning tendencies among students and teachers. The study discovered that professional experience significantly impacted teachers' lifetime learning and curriculum adherence, with significant differences in lifetime learning preferences depending on gender, age, grade level, family socioeconomic status, and department and university satisfaction. In Sub Saharan African countries, Aluko and Ooko (2022) reported on digital literacy experience of teachers in South Africa. A total of 840 participants were purposively selected from urban, semi-urban, and rural areas. findings revealed the gaps between what is expected of teachers and their own realities, besides teachers' eagerness to be involved in digital literacy.

In Kenya, Likoko et al. (2023) noted that there was a widespread consensus that education systems are failing to adequately prepare learners with the relevant 21st century skills necessary to succeed in life, and career and be better citizens. Findings reveal that the educational system in Kenya prioritizes competitive exams while underplaying 21st century skills that are needed to make learners better citizens. This implies that there is a high 21st century skills gap between both the teachers and the learners in most of the public secondary schools in Kenya. The study concluded that in 21st century all educators (teachers) play a critical role in shaping the lives of learners. A study by Masai et al. (2024) investigated the level and application of digital literacy skills of postgraduate students in facilitating adequate usage of electronic resources. A mixed-method approach was adopted taking on survey design and utilizing concurrent parallel design when interpreting and deriving conclusions. The study revealed that postgraduate students possess different levels of digital literacy skills, majority of postgraduates and librarian's digital literacy skills were inadequate; majority of the respondents stated that ICT facilities were inadequate. The study concluded that the digital literacy skills of postgraduate students and librarians was inadequate and this limited their utilisation of electronic resources.

## V. CONCLUSION & RECOMMENDATIONS

### 5.1 Conclusion

The paper concludes that the 21st-century teacher should be the one who has a collection of skills which permit them to guide learners in their technology-assisted learning process in classrooms. Teachers having the digital literacy skills is necessary for the for integration of digital learning in education process in class. The paper concludes that lifelong learning is professional growth which allows teachers to stay updated with the latest educational trends, technologies, and methodologies, improving their teaching effectiveness. Through digital literacy acquisition, lifelong learning improves teacher innovativeness and creativity by incorporating new strategies and tools into their instructional practice, enhancing student engagement and learning outcomes. Lifelong learning in digital technologies assist teachers to adapt to evolving educational standards, curriculum (including the current CBC being implemented in Kenya), and policies, ensuring their teaching remains relevant. Through teacher lifelong learning on digital skills, it enhances their



classroom management techniques by helping create a more productive and supportive learning environment which is key to students' acquisition of required competencies. On their part as teachers, the paper has established that lifelong learning enables teachers to improve their teaching practices, raises their critical thinking and evaluation process the paper has discovered.

## 5.2 Recommendations

Teachers' role is critical in educating students who have to fit and adapt into the changing world. Improving teachers' digital literacy skills is an important undertaking in pushing the digital transformation of education and is an important requirement for instructional effectiveness in modern classroom. This means that teacher digital literacy improvement should not only be theoretical but also applied in teaching, making digital technology a cornerstone for teachers' lifelong learning and professional development, the paper has established. The study also recommends that teachers should make lifelong education a part of their lives rather than a behaviour or learning habit in schools considering the skills they will get will not only be beneficial in their instructional duties but can apply in other part of their lives. Considering the need for teachers with lifelong learning and digital literacy skills and students to be trained by these teachers. This study contributes to the policies discussions, debates, programmes and legislation with respect to lifelong learning and digital literacy. This paper is important in terms of drawing attention to how necessary for teachers to acquire the digital literacy skills by undertaking individual and sponsored in-service trainings programmes.

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