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INTEGRATION OF INFORMATION COMMUNICATION TECHNOLOGY INTO GEOGRAPHY INSTRUCTION IN PUBLIC SECONDARY SCHOOLS IN KENYA. MYTHICAL OR REALITY?

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ABSTRACT

Informational Communication and Technology (ICT) falls under the learner-centered strategy and is likely to improve learner interest and achievement. This is in tandem with the Kenyan government's ICT policy of 2007. The study aimed to assess the extent of ICT integration into geography instruction in Kenya's public secondary schools. The study aimed to determine the institutional factors that influence the integration of ICT into geography teaching, the factors of geography teachers that influence the integration of ICT into geography teaching and learning, and the factors of students that influence the integration of ICT into geography teaching and learning in public secondary schools in Migori County, Kenya. Davis (1989) anchored the study on the technology acceptance model. The study also used a meta-analysis of empirical literature, guided by Ferrer (1998). The study found that institutional, teacher, and student factors impacted the integration of ICT into teaching and learning geography in public secondary schools in Migori County, Kenya. These findings have implications for schools' integration of ICT policy into geography instruction.

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1. INTRODUCTION

The global scenario and business transactions across various fields, including education, heavily emphasize the topic of information, communication, and technology (ICT). Therefore, we should not undervalue its significance. In contemporary society, the quality of teaching and learning is becoming increasingly important (Garzón Artacho et al., 2020; Fernández-Batanero et al., 2022; Haleem et al., 2022). Multiple challenges, ranging from social-cultural to economic and technological, have bedeviled the educational enterprise from the early 20th century into the 21st century. Researchers have conducted empirical studies on the following topics: Empirical studies have been conducted on various aspects of ICT integration in education, including its integration into learning management information systems, its integration into educational

institutional management, its integration into the entire educational enterprise, and its integration into various subject curricula areas, to name a few (Kundu et al., 2020; Sayaf et al., 2021; Koenig et al., 2022).

Pernia (2008) maintains that ICT integration involves the actual application of ICT in teaching work, which means the application of computer and internet technology to enhance teaching and learning. ICT consists of hardware and software, networks, and media for collecting, storing, processing, transmitting, and presenting data in forms such as voice, text, and images. ICT is usable for development and capacity building. It can enhance teaching opportunities and has a significant relationship with learner achievement. Learners who integrate ICT into learning gain deeper insights into complex topics, concepts, and principles (Mielikäinen, 2022; Abedi, 2023). In addition, they are likely to recall information and solve complex problems in the classroom. Technology integration as utilizing the internet, computers, CD-ROMs, interactive media, satellites, teleconferencing, and other technological means in instruction to support, enhance, inspire, and create learning.

The effectiveness of CT integration in teaching and learning, leading to a shift in global cognition and emphasis (Egea, 2014; Kisirkoi, 2015). The effectiveness of ICT integration has resulted in requiring teachers to undergo necessary training to acquire the requisite knowledge, skills, and attitudes. The use of technological and pedagogical content knowledge (TPCK) as a framework for teachers to build their capacity for ICT integration, aligning it with curriculum content and developing technical expertise to meet ICT requirements educational practices.

The study's goal was to establish the integration of ICT into geography instruction in Migori County public secondary schools. The objectives of the study were to establish institutional factors influencing the integration of ICT into geography instruction in public secondary schools in Migori County, to establish teachers' factors influencing the integration of ICT into geography instruction in public secondary schools in Migori County, and to establish students' variables influencing the integration of ICT into geography instruction in public secondary schools in Migori County, Kenya.

We will present the study in the following order: introduction, materials and methods, findings and discussions, conclusions, and implications.

2. METHOD

The research methodology employed meta-analysis, which utilized data from multiple independent studies, each using different tools and approaches but addressing the same theme, to identify overall trends. The main reason for using the meta-analysis technique is to help in combining the results of different reports addressing a single common theme to create a more precise estimate of an effect. Some of the methods used by various researchers whose work was analyzed include descriptive survey design, descriptive statistics, Heckman PR obit model, mixed method approach, Heckman sample selective model, focus group discussions, participatory and epidemiological

methods, consensus model, qualitative and quantitative approaches, and literature review design.

The three essential components of the technology acceptance model, developed by Davis et al. (1989), underpin the central issues of the study: perceived ease of use (PEU), perceived usefulness (PU), and intention to use (IU).

Figure 1 below presents the theoretical framework for the technology acceptance model by Davis et al. (1989).

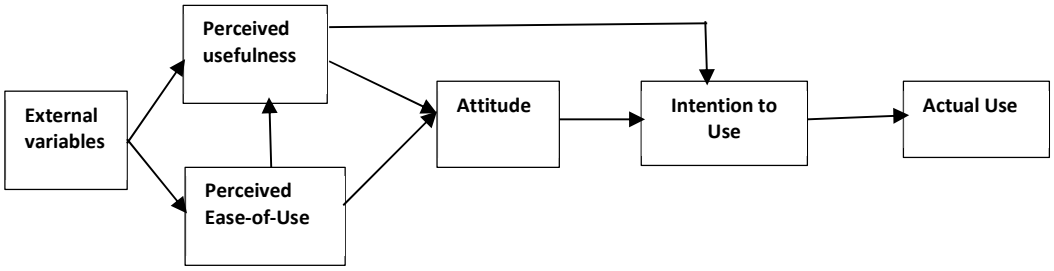

Figure 1. Showing the Technology Acceptance Model by Davis (1989)

3. RESULTS AND DISCUSSION

Based on the results of the analysis, results, and discussion are presented according to the following research objectives.

The Institutional factors influencing integration of ICT into Geography instruction in Public Secondary Schools

Amuko et al. (2015) conducted a study on the opportunities and challenges of integrating ICT in mathematics teaching and learning, using a descriptive design that involved administering questionnaires and interviews to gather data. The study revealed, among other things, that mathematics teachers lacked the necessary skills and knowledge to effectively integrate ICT into mathematics teaching and learning, which consequently led to their laxity in doing so. The study surveyed twelve secondary schools. However, the current study intends to look at the integration of ICT into geography instruction in public secondary schools in Migori County, Kenya, to fill the knowledge gap left by the previous study.

The study objectives, outlined here as relevant themes, guided the analysis and reporting of the collected data. We found that the level of ICT integration in the units of analysis was greatly affected by a number of organizational factors, including the amount and quality of ICT infrastructure, the availability of electricity connections, the presence of ICT technicians to oversee and guide ICT labs and other equipment under the supervision of the head teacher, the organization's ICT Policy Framework, and the provision of essential program support.

The study found that, in terms of ICT infrastructure, the majority of the analyzed schools (60%) had never attempted or had computers for teaching geography. Three schools, accounting for 15%, reported possessing computers. Five schools, which

accounted for 20% of the units of analysis, reported having reasonable levels of ICT integration into geography teaching. These reports were based on geography teachers' responses. In response to the above question, humanities H.O.Ds reported that their school administrations are making mild attempts to integrate ICT into their teaching methods. Fifteen humanities heads (75%) reported this, while five HoDs (25%) stated that their schools had virtually no arrangement to integrate ICT into geography teaching. These demonstrate a lack of institutional commitments to integrating ICT into schools' instruction agendas. We asked 100 Form 3 geography students to report on the institutional factors influencing ICT integration, and their responses revealed the following: 70% of students reported having not been introduced to even the basic computer literacy skills in geography, while 30% of pupils reported having been mildly taken to the computer laboratories but not taught using computers.

This research outlines the desired scenario for the adoption of ICT in geography pedagogy, but the achievement of this noble task is still far off. Of the 20 heads of schools in the 20 schools, 10 (50%) reported that attempts to integrate ICT into schools' pedagogical practices are in the pipeline. When questioned about their plans, they stated that despite their desire for implementation, financial limitations hinder the acquisition of sufficient ICT infrastructure necessary for the program's success. While five head teachers (25%) reported having invested in their ICT infrastructure, it was not sufficient for pedagogy. All indicators related to ICT integration into Kenya's public secondary schools remain unsatisfactory. Five heads of schools in this study would wish to have vibrant ICT programs integrated into teaching and learning; however, resources, more specifically finances, are so scarce that this dream appears like a nightmare despite the fact that the world has gone digital.

Reports also show that most schools don't have enough ICT infrastructure, not enough ICT technicians to manage the few computers and laptops that are there, and not enough computers that can support ICT pedagogy. There are also problems with schools' ICT policies, which could help the program work, and with school-led ICT training programs, which would give students the knowledge and skills they need for ICT integrated pedagogy to work. This demonstrates a serious gap between the main curriculum agenda drivers and implementers.

The study revealed a deficiency in ICT infrastructure availability in schools, a lack of ICT competence among teachers, and a lack of ICT support within the school, according to Gikundi (2016). There is technical support at the school. The study's findings have implications for strategies that identify weaknesses and strengths in results, with the goal of incorporating ICT into teaching and learning processes. Schools must establish partnerships to invest in ICT infrastructure.

Karaca et al. (2013) explored the direct and indirect effects of these factors on technology integration. Factors included teaching experience, support, and attitudes. Education practitioners and researchers in developing countries grappling with the challenges of incorporating technology into their constantly changing curricula and education systems, will find this model of technology integration into elementary education particularly useful.

According to Lau's (2019) findings, elderly teachers were more eager to incorporate ICT into their day-to-day pedagogy and had relatively high positive attitudes towards ICT adoption in Malaysian schools. Interestingly, teachers who reported daily use of ICT in their day-to-day functions still expressed a desire for ICT pedagogical training to make them better practitioners of ICT use in teaching and learning. The findings have implications for ICT integration, highlighting the importance of schools working together in partnerships with the public and private sectors to fund ICT projects and enhance their effectiveness.

Another study was conducted by Ford & Botha (2010) and Graham et al. (2020). These scholars asserted that parents' demand for computers as a means of computer literacy necessitated their integration into teaching and learning in developing world schools.

The findings revealed that elementary school teachers in lower grade levels had a higher level of ICT integration in their teaching compared to those in higher grades (Raby & Meunier, 2011). However, the current study investigates the incorporation of ICT into geography teaching in public secondary schools in Migori County, Kenya, aiming to bridge the research gap from the previous study. It also highlights the importance of adequate maintenance, hardware, and site support.

Teachers' Factors influencing ICT integration into Geography Teaching in Public Secondary Schools

Tenai (2017), on teacher factors influencing the integration of ICT in the teaching of English in public secondary schools in Eldoret East Sub-County, Kenya, adopted a descriptive survey design. We administered questionnaires to gather primary data. The study randomly sampled seventeen public secondary schools. The study discovered a correlation between training and technology literacy, as well as a relationship between gender and technology literacy. The current study will look at the integration of ICT into geography instruction in public secondary schools in Migori County, Kenya, to fill the study gap. An educational enterprise should not overlook the teacher's role in implementing the curriculum. Teachers, who are the key implementers of educational programs in schools, require pre-service training, on-the-job training, and continuous support through retooling to keep abreast of curriculum reforms, including technology-assisted pedagogy. Teachers' factors, such as having the correct knowledge, skills, and attitudes towards teaching or pedagogical dispensation, are not negotiable.

Ismail et al. (2020), from a developing country perspective, assert that the current state of ICT integration into school teaching is inadequate. The study conducted a review of written materials from empirical research. The term technology integration refers to a technology-based teaching and learning process that entails the proper use of technology in schools.

Technology-based teaching and learning, known as ICT integration, utilizes various learner-centered methods such as educational videos, data storage, database use, mind-mapping, guided discovery, brainstorming, and the World Wide Web (www) to enhance the excitement and significance of the learning process (Finger & Strinidad, 2002). ICT

in education is any technology that deals with knowledge sharing or a means of communication in the teaching and learning process.

Churchil (2006) says that technology is a set of tools and resources that amplify individuals' physical and intellectual capacity. The main aim of technological processes in teaching and learning is to improve the accessibility and cost-efficiency of content delivery in education (Schrum & Levin, 2016). ICT use in schools and, more particularly, in the classroom environment is quite essential to enhance teaching and learning processes. The use of ICT in teaching and learning is strongly associated with a measurable increase in learner achievement (Kisirkoi, 2015). Effective ICT integration has a significant effect on learners in that they develop confidence after interacting with ICT tools and work more significantly with teachers as co-learners (Gabe & Grabe, 2007). The concept of co-learning informs ICT integration as an effective instructional means to enhance student learning by creating an enabling learner-centered environment within the school.

Ramorola (2013) established that there was no technology policy about ICT integration in schools, that the number of computers was deficient, that there was a lack of qualified teachers on ICT integration into teaching and learning, and that poor maintenance of the available hardware and software bedeviled the ICT integration process in schools in South Africa. According to Tay et al. (2012), the study established that ICT integration seemed to be higher in English teaching than in mathematics. The study underscored the pivotal role a teacher plays in implementing ICT into instruction and recommended teacher training in ICT skills to make them aware of the significance of ICT integration into instruction.

Apart from that, previous research that is relevant and supports this research is that there are factors that influence ICT integration in the teaching and learning process (Kizza, 2010; Tedla, 2012; Dube et al., 2018). This research will examine the integration of ICT into geography teaching in government secondary schools in Migori Count, Kenya to fill learning gaps.

Students' Factors influencing ICT integration into Geography instruction in Public Secondary Schools

Mbatia's (2014) study on factors influencing school principals' integration of ICT in the school administration of public secondary schools in Githunguri Sub-County, Kiambu County, Kenya, used a descriptive survey design. Factors such as inadequate ICT infrastructure, insufficient ICT technical support, and frequent power outages hinder the integration of ICT into school administration, according to the study. The current study will address the integration of ICT into geography instruction in public secondary schools in Migori County, Kenya, to fill the study gap. Students are key role players in curriculum activities in school, and progressivist schools put them at the center of learning, where they can decide their curriculum and could find handy ICT integration into teaching-learning frames because they are learner-centered with their active engagement in the teaching-learning entries. The inquiry focuses on how learner factors impact the incorporation of ICT into geography instruction in public secondary

schools in Migori County. During their report on this subtheme, students responded to the question, "Do you think ICT is useful for you in learning geography in school?" The students responded, "No, we have been learning geography without the use of computers, and we have been coping well, so the idea of ICT integration is not useful to us." The survey included 80 geography students (80%), whereas 20 geography students (20%) did not participate. underscore Despite the importance of adopting computer-assisted geography instruction due to the shift towards digitalization, concerns were expressed about the insufficient number of computers to support the plan.

Moreover, the majority of us have only received basic computer literacy training, and there is no dedicated computer lab for ICT-assisted learning. These responses shed light on the real-world challenges that hinder the implementation of ICT-assisted pedagogy in Kenyan schools in the 21st century. Headteacher while reporting on the factors influencing ICT integration into geography teaching (20%), head teachers discovered that the high enrollment of geography students surpasses the limited number of computers available, thereby hindering attempts to integrate and implement ICT pedagogy in geographical education. They are in the same vein as the humanities' 20 (100%) HoDs.

Demicri's (2012) study also revealed that teachers overwhelmingly concur that the use of GIS in geography instruction is crucial. However, the current study will investigate the incorporation of ICT into geography instruction in public secondary schools in Migori County, Kenya, aiming to bridge the knowledge gap from the previous study.

Yildrim's 2007 study found that the majority of teachers did not utilize ICT to enhance students' performance in curriculum areas like handouts, tests, and overcrowded classrooms. This was due to a lack of timely technical and pedagogical support, a lack of incentives, a lack of strong leadership, and a lack of collaboration among basic education teachers. These factors were detrimental to the realization of ICT integration in basic education in Turkey at the time of the study. The current study investigates the incorporation of ICT into geography instruction in public secondary schools in Migori County, thereby addressing the knowledge gap that the previous study left behind.

According to Tezcie (2011), the findings indicated that the culture, both in terms of motivation and technical aspects, was not positive, and there were issues with internet access and professional openness. The current study aims to bridge the research gap by examining how ICT is integrated into geography instruction in public secondary schools in Migori County.

Simin et al. (2014) used a descriptive survey design in their study on ICT integration in education. The respondents acknowledged the significance of integrating ICT into teaching as a way of improving the quality of the pedagogical practice of content delivery. The current study aims to explore the integration of ICT into geography instruction in public secondary schools to bridge the knowledge gap.

Several previous studies are also relevant to this research, which highlight the importance of implementing ICT in schools to produce quality teaching (Hong, 2016;

Aslan & Zhu, 2016; Owiti, 2017; Kubota et al., 2018; Loretta & Dike, 2019; Makhaya & Ogange, 2019; Chirwa & Mubita, 2021).

Implications Study

Kenya's ICT Policy of 2007 emphasizes a digitized, learner-centered approach to education, aligning with the magnitude of this study on the integration of ICT into geography instruction in secondary schools. Education today strongly emphasizes a progressivist and constructivist approach, placing the learner at the center of the learning process. There hasn't been any research of this kind, particularly in Migori County, Kenya, that could bridge the knowledge gap and contribute to the existing body of knowledge in that field. This research will fill the knowledge gap in that area and contribute to the existing body of knowledge.

4. CONCLUSION

Based on the study findings, the study authoritatively concludes that: CT integration into geography teaching is too minimal, if any, and that it is a nightmare in most of public secondary schools due to inadequate ICT infrastructure and a lack of clear schools' ICT integration into geography teaching in schools. The lack of ICT literacy and the absence of ICT gadgets among most geography teachers pose significant challenges in implementing this integration in schools. The large number of geography students and the gaps in the ICT infrastructure in most secondary schools in Migori County make the integration of ICT into geography teaching a nightmare. These findings have implications for schools' integration of ICT policy into geography instruction.

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