

Evaluation of Teacher Training in Integration of ICT in Teaching Public Secondary Schools in Tigania West, Meru County, Kenya

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ABSTRACT

Kenya has experienced significant growth in the incorporation of ICT into secondary school curricula in recent years. The Kenyan government has implemented numerous initiatives to enhance this. Information and Communication Technology integration in secondary school teaching and learning environments remains incomplete due to several factors. These include inadequate infrastructure, limited teacher training, resistance to change, and insufficient government policies supporting ICT implementation. Additionally, financial constraints prevent schools from acquiring the necessary technologies, and there is often a lack of ongoing technical support. Despite the growing recognition of ICT's importance in enhancing learning outcomes, these challenges hinder its full adoption, leaving many schools without effective digital learning environments. Several experts contend that the mere installation of technical equipment and infrastructure would not inherently result in the incorporation of ICT in schools unless the teachers receive proper training on how to utilize the technologies. This study aimed to investigate the impact of teacher training on the incorporation of ICT in the instruction of public secondary schools. The study utilized a descriptive survey approach. The sample consisted of 50 public secondary schools, 50 principals, 100 heads of departments, and 200 teachers. The study utilized a stratified random sampling technique to choose schools. The purposive sampling technique was employed to assess school principals, heads of departments, and teachers. The study included a total of 105 participants, consisting of 15 administrators, 30 heads of department, and 60 teachers. Data gathering involved the utilization of questionnaires, interview schedules, and observation checklists. The quantitative data was analyzed using statistical methods such as calculating means, frequencies, and percentages. The interviews yielded qualitative data, which was evaluated using content analysis. The study determined that the training of teachers in ICT had a beneficial and substantial impact on its incorporation into the educational process. The study proposes that it is essential for all instructors to receive specialized training on the utilization of ICT in their teaching practices. One way to accomplish this is by implementing a teacher training curriculum that includes specific content on ICT pedagogy. The Ministry of Education should offer professional development programs in information and communication technology for teachers, as this will enable them to acquire ICT skills. Additional research is required to determine the level of preparedness of secondary school teacher trainers in equipping secondary school teachers with ICT skills. Incorporating integration into the process of teaching and learning.

Keywords: Teacher training, Integration of Technology, Teaching

BACKGROUND

Integrating technology into teaching practices is increasingly vital in secondary education, driven by the digitalization of society and the evolving demands of the 21st-century workforce. Successful technology integration, however, goes beyond merely providing access to digital devices. A crucial aspect of this integration is the preparedness and proficiency of educators. Research highlights that teacher training programs designed to enhance technological competence are essential to bridging this gap (González-Pérez & Ramírez-

Montoya, 2022). These programs equip educators with the necessary knowledge, skills, and competencies to effectively incorporate technology into their instructional practices, which is essential in preparing students for the digital age (Salas-Pilco *et al.* 2022).

With the increasing prevalence of technology in classrooms, the scope of teacher education programs has broadened. Historically, these programs have emphasized pedagogy, expertise in the subject field, and effective classroom management. Nevertheless, the swift expansion of technology in educational environments requires including technology integration training in teacher education courses. This inclusion guarantees that educators possess extensive knowledge of conventional teaching techniques and can utilize technology to improve student learning results (Kilag *et al.* 2024). Including technology in teacher education programs has become extremely important, highlighting the necessity for ongoing professional development.

Many teacher education programs have attempted to include technology training, but it is still being studied to see how effective these tactics are in preparing teachers for the digital classroom (Han *et al.* 2024). It is crucial to comprehend the most efficient methods and tactics for incorporating technology into teacher education programs to guarantee that teachers are sufficiently equipped to utilize technology's potential to improve student learning results (Kareem *et al.*, 2022). This research paper seeks to investigate and assess the impact of teacher training on incorporating technology into the teaching process. The study aims to analyze current literature, combine empirical studies, and examine successful case studies to identify and assess the methods, models, and frameworks used in teacher education programs to enhance the incorporation of technology. The research paper evaluates these tactics on teachers' technological proficiencies, the frequency of teachers' participation in workshops and in-service training to enhance their effectiveness, and the relevance of ICT teacher training in integrating technology.

This research paper offers significant insights and practical recommendations for teacher educators, policymakers, and educational institutions engaged in teacher training. Results of this study will enhance the existing information on the incorporation of technology in teacher training, ultimately promoting the creation of more efficient and relevant programs that tackle the requirements and difficulties of contemporary classrooms. The research paper explores the most effective methods, creative strategies, and revolutionary models that can empower prospective educators to skillfully and efficiently incorporate technology into their teaching methods. The goal is to equip them with the necessary skills to navigate the digital sector and facilitate valuable learning experiences for their students.

Study objectives

1. Assess the frequency teachers participate in workshops and in-service training to enhance their effectiveness.
2. To ascertain the relevance of teacher training in ICT for integrating technology in teaching and learning.

Theoretical framework

The Technological Pedagogical Content Knowledge framework by Mishra and Koehler (2006) is an essential model for integrating technology in education, highlighting the interaction between three fundamental domains of knowledge: content, pedagogy, and technology. TPACK posits that for effective integration of technology in teaching, educators must possess not only expertise in their subject matter (content knowledge) and comprehension of effective teaching strategies (pedagogical knowledge), but also proficiency in utilizing technology to enhance both of these domains (technological knowledge). Global studies on the Technological Pedagogical Content Knowledge (TPACK) framework by Mishra and Koehler (2006) reveal its widespread application in various educational contexts, with researchers focusing on pre-service and in-service teacher education. The model has been adapted for diverse regions, including Asia and Europe, where educators face different technological and pedagogical challenges (Moshtari & Safarpour, 2024). Research emphasizes that TPACK enables teachers to merge content knowledge with appropriate pedagogical methods and technology, improving teaching efficacy across subject areas and grade levels (Fabian *et al.* 2024). The paradigm

emphasizes that effective integration occurs where different knowledge domains cross, enabling teachers to create and execute technology-enhanced learning experiences that are pedagogically sound and tailored to the specific topic. Studies indicate that educators who strongly understand Technological Pedagogical Content Knowledge (TPACK) are more likely to employ technology proficiently inside their classrooms, resulting in improved educational achievements (Ozden *et al.*, 2024).

LITERATURE REVIEW

Incorporating ICT into teacher education is crucial for equipping educators with the necessary skills to meet the requirements of contemporary classrooms. Efficient integration necessitates using technology in the curriculum, offering practical experience, and guaranteeing ongoing professional growth. These tactics facilitate the development of essential abilities and self-assurance in future educators to utilize technology effectively. Furthermore, the involvement of mentors and the collaboration among educators, together with reflecting on their teaching methods, are essential for improving instructional tactics and optimizing the advantages of technology. This complete strategy guarantees that educators are adequately prepared to improve student learning by utilizing technology effectively.

Professional Development and Training

Professional development is crucial in equipping teachers with the necessary skills and knowledge to integrate technology into education effectively. This program offers organized educational experiences for teachers to gain and improve the abilities and understanding necessary to integrate technology into their teaching methods. Studies demonstrate that well-designed professional development initiatives centered around technology integration can positively impact teachers' attitudes toward technology, increase their self-assurance in digital tools, and improve their instructional methods in the classroom (Nurhidayat *et al.* 2024). These programs are most efficient when they incorporate practical activities, enabling teachers to directly interact with the technology they will utilize in the classroom. Moreover, including collaborative learning opportunities, where teachers can exchange experiences and techniques, enhances professional development. Continued assistance, such as continuing guidance or availability of resources, is essential to guarantee that the acquired technology integration techniques are regularly implemented and improved over some time (Warr *et al.* 2023). This holistic approach to professional development facilitates teachers in embracing novel technology and effectively incorporating it into their instructional methods, ultimately resulting in enhanced student achievements.

Technology Integration Competencies for Teachers

Identifying essential competencies for effective technology integration in education is a critical focus of contemporary research. Key competencies include digital literacy skills, which enable teachers to navigate and utilize digital tools and resources proficiently.(Nurhidayat *et al.*, 2024). Technological Pedagogical Knowledge is crucial, as it allows teachers to effectively integrate technology into their pedagogical strategies, creating more engaging and compelling learning experiences. Adaptability is another essential competency, as technological change requires teachers to be flexible and open to new tools and methods. Research suggests that teacher education programs should explicitly incorporate these competencies into their curricula, ensuring that pre-service teachers have ample opportunities to develop and refine these skills through theoretical and practical experiences (Hanisch & Eirdosh, 2023).

Workshops and in-service training

Workshops and training for teachers can significantly affect technology integration in education. Workshops provide teachers with hands-on training in using various technological tools and platforms (Josué *et al.*, 2023). This improves their technological proficiency, making them more confident in incorporating it into their teaching practices. Technology training equips teachers with skills to manage digital classrooms effectively. They learn techniques for monitoring students' progress, providing timely feedback, and addressing

technological issues that may arise during lessons(Adiyono *et al.* 2024).

Relevance of teacher training in ICT in integrating technology in teaching and learning.

For technology integration in education to be successful, teachers must receive training in information and communication technology. This will ensure that teachers have the knowledge and abilities to confidently and creatively use digital technologies in the classroom. Teachers who have received this training are better equipped to keep up with the latest educational technology developments and create engaging, innovative lessons for their students (Ong & Annamalai, 2024). It encourages the productive use of technology in the classroom by assisting educators in integrating technological tools with their subject-matter expertise to create engaging, collaborative classrooms that put students at the center (Zaafour, 2024). In addition, classes that promote critical thinking, collaboration, and creativity are more likely to be designed by instructors who have received training in the use of ICT (Kurt, 2015). Educators who have received information and communication technology training are better able to implement technological solutions into their lessons, even when they face challenges like uncertainty or opposition to change (Kurt, 2015).

MATERIAL AND METHODOLOGY

The study utilized a descriptive survey approach. Data gathered through this design was gathered from both numerical and descriptive sources. The research was conducted in Tigania Sub-County, in Meru County, Kenya. The target population for this study consists of 350 respondents. The study utilized a stratified random sampling technique to categorize 50 public secondary schools in Tigania West Sub County into 5 groups, resulting in a sample size of 105 participants. This study employed questionnaires, interview schedules, and observation schedules to collect participant data. Quantitative data was analyzed using statistical methods such as calculating means, frequencies, and percentages. Interviews yielded qualitative data, which was evaluated using content analysis.

DATA FINDINGS, PRESENTATION, AND DISCUSSIONS

The study sought to determine how teachers’ ICT training influences ICT integration in teaching-learning. Under this, the study focused on two objectives, which focused more on the following areas: trained teachers in ICT and their level of training, teacher attendance in workshops and service training, and how teacher training is relevant in integrating technology. The findings from each area are discussed below.

Trained teachers

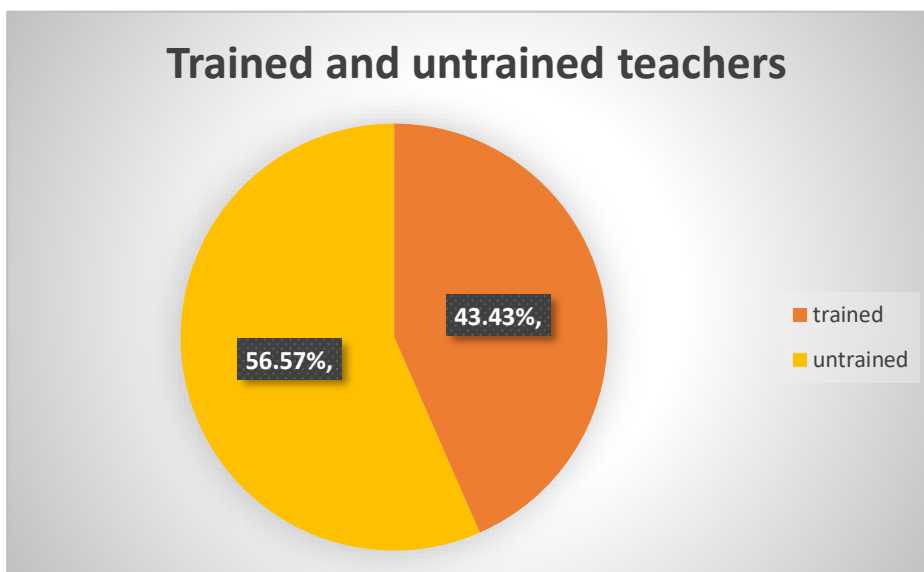


Figure 4.1: Trained Teachers

The study's findings indicate a significant gap in the technological preparedness of educators, with 56.57% of respondents lacking basic technological skills and only 43.43% having received training, primarily in computer packages. Even among the trained individuals, many felt their expertise was insufficient for effectively integrating ICT into classroom instruction. This aligns with the research by [Phulpoto *et al.* \(2024\)](#), which emphasizes that proper training is essential for successfully deploying ICT in education. The absence of comprehensive training programs hinders teachers' ability to utilize technology effectively, leading to incomplete ICT integration in classrooms. [Phulpoto *et al.* \(2024\)](#), assert that inadequate teacher training in ICT is a significant barrier to its successful use in educational environments, contributing to a digital divide and inconsistent ICT utilization.

Place of Training

Place	Frequency	Percent
Commercial college	48	52.2
School organized	15	16.3
TTC	20	21.7
universities	9	9.8
Total	92	100.0

The study highlights the varied sources of basic ICT training for teachers in Kenya, where 21.7% received training from Teachers' Training Colleges (TTC), 16.3% from their schools, 52.2% from commercial colleges, and 9.8% from universities. Despite these training efforts, the research reveals that teachers are unprepared to integrate ICT into their teaching practices. Most training focuses on basic technology literacy and operating ICT tools rather than equipping teachers with the pedagogical skills necessary to effectively integrate technology into classroom activities. This finding is consistent with [Murithi & Yoo, \(2021\)](#), who points out that the emphasis on technology literacy in Kenyan ICT training leads to a gap in teachers' abilities to use technology meaningfully in the learning environment, thereby limiting the full potential of ICT in education.

Table 4.2: Attendance of ICT Training/Workshops

	Frequency	Percentage
Yes	52	56.5
No	26	28.3
Not sure	14	15.2
Total	92	100.0

The infrequent ICT training and workshops, which occur only once a year and involve limited teacher participation, with only 53.6% confirming attendance and 46.4% uncertain, reflect a significant gap in continuous professional development for educators. This finding highlights a crucial challenge in integrating technology in schools, as it demonstrates a lack of consistent and meaningful engagement in ICT training. Such sporadic opportunities for professional growth hinder teachers from acquiring the necessary skills to integrate ICT effectively into their teaching practices.

This situation echoes the research by [Demir \(2024\)](#), which reported that nearly half of the teachers did not participate in in-service training or professional development, leading to insufficient technological competence and confidence. The failure to provide regular, comprehensive training limits teachers' ability to use ICT tools effectively, ultimately compromising both their teaching efficiency and students' learning outcomes. Continuous professional development is essential for keeping up with technological advancements and ensuring teachers can effectively utilize digital tools in the classroom.

Akram *et al.* (2021) emphasize that teachers with advanced skills and knowledge in ICT are significantly more likely to integrate technology effectively into their classrooms, which can lead to enhanced student achievement. This underscores the importance of increasing the frequency and accessibility of ICT training for teachers. More frequent training sessions would equip a broader range of educators with the necessary skills, fostering better integration of technology in teaching practices and improving educational outcomes.

However, the study's respondents revealed that many teachers were excluded from these crucial workshops due to financial constraints. In many schools, principals select only a few teachers to attend ICT workshops, while others are left out. This selective participation is largely driven by the lack of funds, which prevents schools from providing comprehensive training for all teachers. As a result, only a limited number of teachers benefit from these professional development opportunities, creating a disparity in ICT competence among the staff. This not only hinders the overall technology integration in schools but also limits the potential benefits for student learning, as the teachers most in need of training are often unable to participate.

Relevance of technological training in education

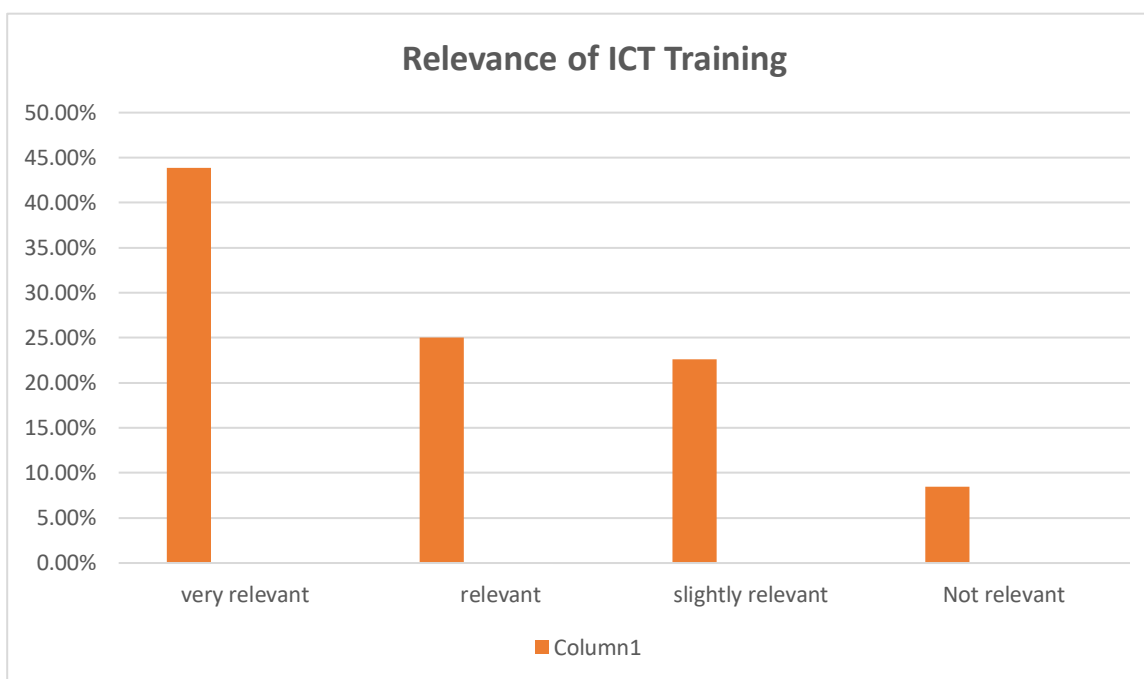


Figure 4.2 Relevance of ICT training

Respondents indicated that technology training was very relevant 43.9%, relevant 25.0%, slightly relevant 22.6%, and not relevant 8.5%, as shown in **Figure 4.2** above. The research findings indicate that teachers who participated in ICT training and workshops found the training highly relevant for teaching. 22.6% of the respondents felt that the training was slightly relevant. In comparison, 8.5% found it irrelevant to teaching. These findings contradict an earlier study Pappa *et al.*, (2024), which reported that most teachers who took part in technology training deemed it irrelevant to classroom teaching. The study also found that most participants stated that technology training made their teaching more effective, leading to improved student performance. However, it was noted that in-service training on technology integration was rarely available for teachers, with only 71.4% attending technology workshops or training once a year. In comparison, 14.3% had not attended any. This lack of training indicates insufficient support for teachers to upgrade and update their ICT knowledge. The inadequacy of appropriate technological skills was identified as a barrier to integrating technology into the teaching process, consistent with a study's findings (Pappa *et al.*, 2024). Their research demonstrated that professional development significantly influences integrating technology in the classroom. The respondents also emphasized that training helps improve teachers' use of technology by equipping them with the necessary skills and knowledge to utilize ICT equipment in the classroom and improve their attitudes.

CONCLUSIONS

The study concludes that teachers had been trained in basic computer literacy at the certificate level and had no ICT training in their subject areas. This means they are limited in ICT competency. Therefore, teachers in ICT in the respective subject areas need in-depth training to develop the competency and confidence needed to integrate ICT into teaching and learning. There is a need for specific training on how teachers can use ICT in teaching, not general training on operating computers.

RECOMMENDATION

The study recommends that a teacher professional development program that includes regular workshops over an extended period could effectively increase teacher confidentiality and competence in using technological tools in teaching.

The study also recommends further study on how well teacher trainers prepare secondary school teachers for ICT use.

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