



Digital Competence of Teachers as a Predictor of Learner Achievement in Composition writing in Kitui County, Kenya

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Abstract

The integration of Information and Communication Technology (ICT) in education has become a global priority, yet its success in the classroom largely depends on teachers' proficiency in using digital tools. In Kenya, specifically, the relationship between teachers' digital competence in utilizing instructional videos and learners' subsequent achievement in critical language skills, such as composition writing, remains underexplored. This study addresses this gap by examining how teacher competencies influence learner outcomes in English composition writing.

Objectives: To determine the teachers' digital competencies in the use of instructional videos and learners' achievement in English composition writing in secondary schools in Kitui County, Kenya.

Methods: This study employed a quasi-experimental design involving 12 teachers of English and 320 Form Three learners from four selected extra-county schools in Kitui central Sub-County. Data were collected using teachers' questionnaires to assess their training, experience, and competence in using instructional videos. A standardized composition writing test was administered to learners. Pearson's Chi-square and independent t-test were used to analyze the correlation and difference in mean scores between the experimental and control groups.

Results: Teachers exhibited moderate levels of digital competencies, with a majority having attended at least one professional development workshop on ICT integration. The findings revealed a significant positive correlation between learners' academic achievement in composition writing and their frequency of exposure to instructional videos. Learners in the experimental group, who were taught using instructional videos, achieved a substantially higher mean score ($M=84.96$, $SD=12.346$) compared to the control group ($M=59.7$, $SD=19.592$). The difference was statistically significant, with a p-value of less than 0.001.

Conclusion: The study concludes that teachers' digital competence, particularly their skill in integrating instructional videos, is a crucial determinant of learners' success in composition writing. The findings underscore the necessity for targeted professional development programs and enhanced infrastructural support to bridge the digital skills gap and improve educational outcomes in Kenya secondary schools.

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1. Introduction

The global educational landscape is undergoing a significant digital transformation, with Information and Communication Technology (ICT) emerging as a cornerstone of modern pedagogy (UNESCO, 2023) ^[17]. Among the diverse ICT tools available, instructional videos have gained significant prominence for their capacity to enhance learners' engagement, facilitate conceptual understanding, and support differentiated instruction. (Brame, 2016; Mayer, 2020) ^[4, 13].

However, the mere availability of such technological resources is insufficient to guarantee improved educational outcomes. The efficacy of these tools is heavily mediated by the teacher's ability to effectively and pedagogically integrate them into the classroom (Mishra & Koehler, 2006) ^[14]. This ability, broadly defined as "digital competencies," encompasses the skills, knowledge, and attitudes required to utilize digital technologies effectively for professional practice and student learning (European Commission, 2022) ^[7]. In Kenyan context, the government has made significant strides in promoting Digital Literacy Programme (DLP) aimed at integrating ICT into primary and secondary education (Republic of Kenya, 2019) ^[16]. The Teacher Service Commission (TSC) has also launched national wide ICT integration training programs for teachers, focusing on developing digital lesson plans, implementing digital repositories (Education Board, 2026) ^[6]. Despite these efforts, a significant skills gap persists among educators, impacting the quality of technology-mediated instruction (Kithungu *et al.*, 2021) ^[12]. English language instruction, particularly the teaching of composition writing, presents a unique opportunity for the application of instructional videos. Composition writing requires learners to master complex cognitive and linguistic skills, including planning, organizing, and expressing ideas coherently (AI-Hazmi, 2021) ^[1]. Traditional instructional methods often fall short of fostering these skills, leading to suboptimal performance in national examinations (KNEC, 2022) ^[11].

Research has consistently highlighted the potential benefits of multimedia learning, with studies showing that well-designed instructional videos can improve student outcomes in various subjects, including writing (Guo *et al.*, 2014; AL-Jarf, 2019) ^[9, 2]. A recent quasi-experimental study on Malaysian WSL learners demonstrated significant gains in writing performance when task-supported language teaching was delivered through a blended learning environment that incorporated digital tools (Johari *et al.*, 2026) ^[10]. Similarly, research on digital learning communities in the United States found that successful integration of technology, student experiences, and explicit feedback had significantly affected on increasing writing achievement (DOAJ, 2024) ^[5]. However, the evidence bases in Kenya, particularly concerning the link between teachers' digital competence and learners' achievement in specific competencies like composition writing, remains limited. This study addresses a crucial gap investigating how the competencies of teachers in using instructional videos correlate with the academic performance of their learners in composition writing within Kitui County.

This study was guided by two theoretical frameworks: the ACTIONS Model proposed by Bates (1995), which provides a comprehensive framework for analyzing the integration of technology in education, and Albert Bandura's Social Learning Theory (1977) ^[3], which emphasizes observational learning. The ACTIONS model (Access, Costs, Teaching & Learning, Interactivity & User-Friendliness, Organizational Issues, Novelty, and Speed) was used to assess the factors influencing the effective use of instructional videos. Social learning theory posits that learners acquire new knowledge and behaviours by observing models, which is directly applicable to how instructional videos can effectively demonstrate effective composition writing techniques. The study hypothesized that there is no significant relationship between teachers' digital

competencies in using instructional videos and learners' achievement in English composition writing.

2. Materials and Methods

2.1. Research Design and Location

This study adopted a quasi-experimental design with a mixed-methods approach to establish a causal relationship between the use of instructional videos and learner achievement. The quasi-experimental design is particularly appropriate for educational research where random assignment is not feasible, as it allows for the comparison of groups that share similar characteristics (Gopalan *et al.*, 2020) ^[8]. The research was conducted in Kitui Central Sub-County, Kitui County, Kenya, an area that has historically recorded below-average performance in English composition writing. The average performance score in this sub-county (3.8) is lower than the national average (4.0), making it an appropriate site for investigating factors that influence achievement. The sub-county comprises 20 secondary schools (18 public and 2 private), with limited access to modern technology.

2.2. Target Population, Sampling and Sample Size

The target population comprises 5060 teachers and all Form Three learners from the 183 secondary schools in Kitui County. Purposive sampling was used to select four extra-county schools (two boys' schools and two girls' schools) to ensure uniformity in admission criteria, academic standards, and teacher qualification's, staffing levels, resource availability, and learning environments. This homogeneity helped reduce the influence of confounding variables that could affect the study findings.

Simple random sampling was then applied to select 80 Form Three learners from each school, resulting in a total of 320 students' participants. Form three learners were specifically chosen as they had been exposed to various composition writing genres and had sufficient experience with English language instruction to benefit from the intervention. Purposive sampling was also employed to select all 12 teachers of English from these four schools, as well as the 4 school principals, who provided institutional perspectives. This sampling strategy ensured a focused and representative sample for analyzing the specific research objectives.

2.3. Data Collection Instruments

2.3.1. Teachers' Questionnaires

A structured questionnaire was administered to all 12 teachers of English to collect data on their professional qualifications, years of teaching experience, participation in professional development workshops, and self-reported competence in using video-based instruction. The questionnaire included both closed-ended and open-ended items to capture both quantitative and qualitative aspects of their competence.

2.3.2. Standardized Achievement Test

A pre-test and post-test design were used to measure learners' achievement in composition writing. The tests were standardized and aligned with the Form Three English syllabus, assessing six cognitive levels based on Bloom's taxonomy. The pre-tested served to establish baseline, while the post-test, administered after a period of time using instructional videos in experimental group and traditional convention in control group. Two independent raters assessed

the compositions to ensure reliability, and inter-rater reliability was computed.

2.3.3. Classroom Observation Schedule

A non-participatory observation schedule was used to directly observe and record classroom practices. The researcher observed how teachers began lessons, the materials they used, the methods employed to engage learners, and the overall classroom dynamics during composition writing instruction. This provided a critical check on the self-reported data from the questionnaires and offered rich contextual information.

2.3.4. Interview Schedule

Semi-structured interviews were conducted with school principals and selected teachers to gather qualitative data on perception of instructional videos, challenges in implementation, and institutional support for technology integration.

2.4. Piloting, Validity, and Reliability

The research instruments were piloted in two schools that were not part of the final sample to assess clarity and identify potential ambiguities. Content validity was established by having the instruments reviewed by experts in educational research and English language teaching. The reliability of the questionnaires was assessed using the test-retest method, which yielded a high degree of consistency (Pearson's correlation coefficient $r > 0.70$). For the standardized achievement test, inter-rater reliability was established by having multiple independent raters evaluate a sample of the writing scripts, with a high correlation coefficient found between their scores.

2.5. Data Collection Procedures

The study was conducted in phases over a period of time. Official approval was obtained from Kenyatta University's Graduate School, the National Commission for Science, Technology and Innovation (NACOSTI), and the Kitui County Education Office. Permission was sought from school principals and teachers. Ethical considerations were paramount, with informed consent obtained from all participants (Mugenda & Mugenda, 1999) ^[15]. Teacher and learner questionnaires were administered. Pre-tests were administered to all 320 learners. Classroom

observations were conducted.

The intervention was implemented over a period of eight weeks. The experimental group (n=160) received composition writing instruction using instructional videos, while the control group (n=160) received instruction using traditional conventions. Teachers in the experimental group were trained on how to effectively integrate instructional videos into their lessons, following best practices for video-based instruction (Brame, 2016) ^[14].

Post-tests were administered to both groups. Teacher and learner questionnaires were re-administered. All data were compiled, coded, cleaned, and entered into statistical software for analysis.

2.6. Data Analysis

Data collected were analyzed using the Statistical Package for Social Sciences (SPSS) version 32.0. Descriptive statistics were used to summarize the data on teachers' competencies and learner performance. Inferential statistics, including Person's Chi-square tests and independent sample t-tests, were used to test the significant of the relationship between teachers' digital competencies and learners' achievement. A p-value of <0.05 was considered statistically significant. Thematic analysis was used to analyze qualitative data from open-ended questionnaires items, classroom observation, and interviews. The data were then presented using figures, graphs and tables to aid in interpretation.

2.7. Ethical Considerations

The study adhered to ethical guidelines for educational research. Ethical approval was obtained from Kenyatta University's Ethics Review Committee and NACOSTI. Informed consent was obtained from all participants, including school principals, teachers, and learners. Participants were assured of confidentiality, and their identities were anonymized in the analysis and reporting. Participation was voluntary, and participants had the right to withdraw at any time without consequences.

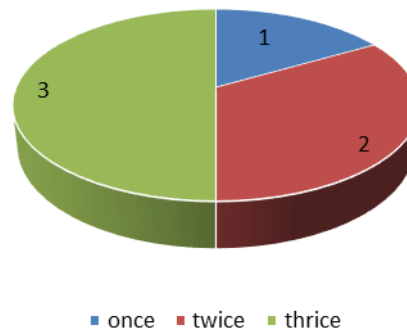
3. Research Findings and Discussions

3.1. Professional Development Participation

The study examined teachers' participation in professional development programs, including in-service workshops, seminars, and ICT training.

Table 1: Teachers' professional Development Participation

Professional Development Activity	Number of Teachers (n=12)	Percentage (%)
3 workshops	3	25.0
2 workshops	2	16.7
1 workshop	1	8.3
Multiple workshops	6	50.0
Total	12	100.0

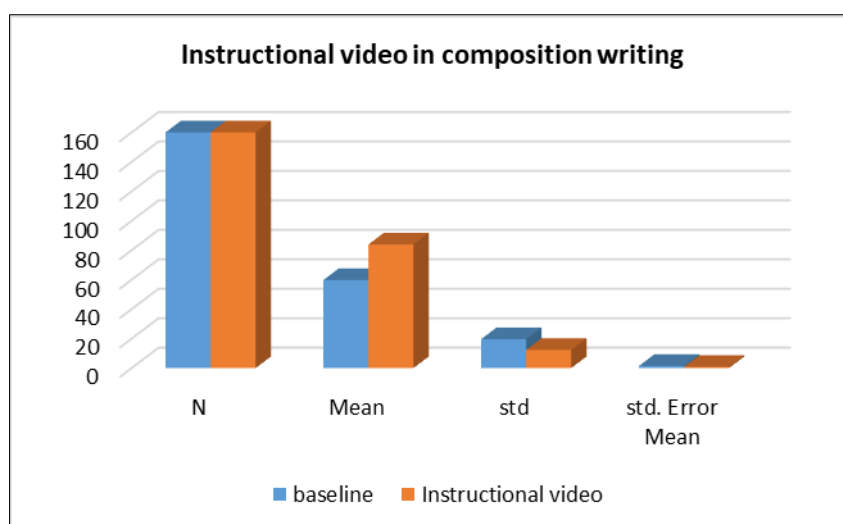
Teachers workshop attendance**Fig 1**

The findings reveal that majority of teachers (58.3%) had attended ICT training workshops, indicating better learner performance to high professional development training. 25% had attended three or more workshops, 16.7% had attended two workshops, and 8.3 % had attended one workshop.

The table 2 below present comparative academic achievement in composition writing between the learners who received treatment and those who received baseline instruction.

Table 2. The Influence of the Use of Instructional Videos on Composition Writing in Academic Achievement

Group	N	Mean	Std. Deviation	Std. Error Mean
Baseline	160	59.70	19.592	1.392
Instructional Video	160	83.89	12.346	0.762

**Fig 2**

The research noted the main challenges to digital competency development were lack of training (75%), poor internet connectivity (66.7%), limited access to technology (58.3%), and difficulty selecting relevant videos (58.3%).

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