

Effect of Digital Media on Spelling Skills Among Lower Primary Pupils of Dodoma City in Tanzania

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Abstract

This study investigated the effect of digital media, particularly video clips, on enhancing sound-spelling skills among lower primary school pupils (grades one and two) in Dodoma City, Tanzania. The objective was to evaluate how digital media can support early literacy development. An experimental design was employed, involving 160 pupils from two public schools, 80 in the experimental group and 80 in the control group. Stratified sampling was used to select pupils who had received F grades in previous writing assessments. A standardised test was used to collect data before and after the intervention. The study was based on the Cognitive Theory of Multimedia Learning, highlighting the value of integrating visual and auditory content into the learning process. Data were analysed using correlation and the Univariate General Linear Model. Findings showed that pupils who engaged with video clips significantly improved their spelling skills more than those who did not. The analysis also revealed a strong positive relationship between digital media use and spelling performance. The study concludes that incorporating video-based digital media into classroom instruction can effectively enhance spelling skills among early-grade learners. It recommends that education stakeholders, including policymakers and curriculum developers, consider integrating such tools into early literacy programs.

Keywords: Digital media, Enhancing, Writing skills, Lower Primary Pupils.

Introduction

Writing skills are a fundamental component of effective communication, enabling individuals to express their thoughts clearly and coherently (Schmoker, 2018). These skills encompass grammar, punctuation, vocabulary, and sound spelling, all contributing to successful written expression (Alimi, 2020). Proficiency in writing is widely recognized as a hallmark of an educated individual. It remains one of the most highly valued skills in the workforce (Schmoker, 2018). Within the classroom and beyond, writing is a vital tool for learners to articulate their ideas and experiences (Casey, 2023). However, persistent spelling challenges are common among students and professionals, often hindering the quality of written communication (Coronado, 2024).

Globally, writing proficiency remains a significant concern. UNESCO (2017) reported that over 617 million primary school pupils struggle with writing in English, with Sub-Saharan Africa experiencing the highest difficulty rates. Approximately 89% of pupils in this region face challenges in acquiring writing skills, compared to 80% in Central and Southern Asia and 64% in Western Asia and Northern Africa. Furthermore, research by Eklund *et al.* (2015) and Moll *et al.* (2020) highlighted ongoing problems in achieving stable spelling accuracy among learners.

Despite numerous interventions, such as enhancing teaching materials and teacher training for early grades, implementation has been limited and largely ineffective (UNESCO, 2018). Although information and communication technology (ICT) advancements have transformed many educational practices, minimal exploration remains of how digital media, such as audio, video, images, and games, can be leveraged to support writing development in lower primary education (Kafyulilo, 2015). Research suggests that integrating multimedia tools like videos, digital games, and images into instruction can significantly improve pupils' writing, particularly in terms of spelling (Carr, 2020; Ferro, 2019). Digital media also fosters creativity and allows learners to experiment with new forms of expression (CITE). For instance, Kim and Bang (2020) demonstrated that blogs, digital storytelling, and collaborative writing tools increase student engagement and motivation by encouraging frequent writing and broader audience interaction.

In this context, the present study was conducted in Dodoma City, Tanzania, making it the first of its kind in the region. It focused on how video clips could enhance spelling skills among lower primary pupils. Previous studies have examined various digital approaches to writing instruction. Alemi *et al.* (2020) and Rezanejad *et al.* (2022) investigated digital storytelling, improving students' attitudes and writing performance. However, unlike the current study, they focused on general writing rather than spelling. Similarly, Şevik (2020) and Utama *et al.* (2021) explored the impact of digital games on writing among primary-level English as a Foreign Language (EFL) learners. Their results suggested that digital games positively influenced learners' writing abilities, supporting their integration into EFL instruction. In contrast, the present study concentrated on video clips and their specific impact on spelling.

Ahmad *et al.* (2021) and Felanie (2021) examined the use of YouTube videos in teaching descriptive writing in Indonesia. Their findings revealed that visual learners in experimental groups outperformed their auditory peers,

indicating that video content can enhance writing outcomes. While their study centred on descriptive texts, it aligns with the current research focusing on multimedia tools for writing instruction.

Additional studies by Mbwambo (2021) and Maeda and Juma (2024) emphasized the role of digital media in improving early-grade writing abilities. These studies noted that tools like cartoons, instructional videos, projectors, and platforms like YouTube and Twinkl can enhance pupils' engagement and writing proficiency. While Maeda and Juma's work was particularly relevant due to its focus on Dodoma City, the current study extends its findings by concentrating specifically on spelling skills through video clip integration.

Despite ongoing reforms, such as developing ICT policies, teacher training, and improved instructional materials, challenges in writing proficiency among lower primary pupils persist (Coronado, 2024). The potential of digital media tools, such as videos, games, images, blogs, educational apps, and digital storytelling, remains underutilized in this context (Carr, 2020; Ferro, 2019). Therefore, this study aimed to investigate the effect of video clips on spelling development among lower primary pupils in Dodoma City, Tanzania. By focusing on this specific aspect of writing, the study contributes to the growing body of research advocating for digital media integration in early education.

Theoretical framework: Multimedia Learning Theory

The Multimedia Learning Theory, developed by Mayer and Moreno (1999), posits that meaningful and deeper learning occurs when information is presented through multiple channels such as text, audio, video, games, images, and graphics rather than text alone. This theory explains how information is processed in stages through sensory memory, working memory, and finally into long-term memory, thereby enhancing comprehension and retention.

By incorporating digital media into instruction, particularly in subjects like arithmetic or language, abstract concepts can be simplified and made more accessible to learners. The theory provides a cognitive framework for understanding how learners form meaningful connections between words, sounds, and images (Mayer & Moreno, 2003). In a learning environment where pupils engage multiple senses, multimedia resources help create coherent mental models, enabling pupils to grasp complex content better.

Digital media, through its integration of text, sound, graphics, and visuals, offers diverse pathways for learners to interpret and understand information. This multimodal delivery enhances core academic skills, including writing and spelling, by engaging visual and auditory processing channels (Glowalla, Kohnert, Schmidt, & Weigand, 2010). In particular, video clips can reinforce sound-spelling associations by pairing spoken words with visual representations, aiding in memory retention and understanding.

Thus, the Multimedia Learning Theory serves as a valuable foundation for this study, which examined how digital media, specifically video clips, can enhance writing skills, focusing on spelling among lower primary school pupils in Dodoma City, Tanzania. This location was selected due to socioeconomic disparities that limit students' access to digital learning tools both in and out of school (Weda, 2020).

Previous studies have consistently shown that multimedia elements such as videos, educational games, and audio materials enhance comprehension and increase learner motivation and engagement (Gee, 2003; Prensky, 2001). Visual tools help translate abstract phonetic and spelling concepts into more concrete and understandable forms (Arcavi, 2003), while audio-visual materials offer a richer sensory experience that supports stronger memory encoding (Fletcher & Tobias, 2005).

This research was designed to explore the specific role of video clips in developing spelling skills, guided by the assumption that there is a significant relationship between the use of digital media and improved sound-spelling ability in young learners. The goal was to provide empirical evidence on the effectiveness of video-based instruction in enhancing foundational writing skills, thus contributing to the broader discourse on integrating digital media in early childhood education.

Methodology

Participants

The study involved 160 respondents (80 in the control and 80 in the experimental groups) from two public schools in Dodoma City. A convenient sampling technique was used to select the schools by considering the availability of digital devices like projectors and laptops. A stratified sampling technique was used to select a stratum of pupils with F-grade scores in the pre-test, specifically basic sounds and word pronunciation. The pre-test was conducted on all students before the intervention. The students were selected and then divided into two groups, with 50% in the control group and

50% in the experimental group. Out of 160 pupils who participated in the study, 80 were female, and 80 were male. Among the females, 40 were in the control group, and 40 were in the experimental group. Similarly, the males were divided into two groups, with 40 in the control group and 40 in the experimental group. Moreover, 36.25% (n=58) in the experimental group and 13.75% (n=22) in the control group were between 6-7 years old. 13.75% (n=22) in the experimental group and 36.25% (n=58) in the control group were 8-9 years old, making a total of 100% (n=160) of all pupil respondents. In terms of the class level, 30% (n=48) in the experimental group and 20% (n=32) in the control group were in standard one, while 20% (n=32) in the experimental group and 30% (n=48) in the control group were in standard two. 50% (n=80) of the participants in the experimental group were selected from school A, and 50% (n=80) were from school B (see Table 1). The intervention in the experimental group was conducted for eight weeks. During the intervention, students used video clips with spelling writing content to learn spelling writing skills. At the same time, the control group maintained a traditional chalk-and-talk method where the Teacher taught manually.

Data Collection Procedures

The intervention was over ten weeks and structured into three distinct phases. In the first phase, conducted during the first week of February 2023, a pre-test was administered to all participating pupils to assess their existing knowledge of basic sounds and word pronunciation. The test consisted of ten items: three focused on basic sound identification and seven on word pronunciation.

The second phase involved a one-week training program for ten Grade One and Grade Two teachers. The training aimed to equip them with the necessary skills to incorporate videos and digital games into their reading lessons. Teachers were taught to access relevant digital content and integrate it effectively into classroom instruction. Schools provided digital devices such as internet-connected laptops and projectors to facilitate this process.

The third phase consisted of eight weeks of classroom implementation, during which teachers conducted 40-minute daily sessions. These sessions integrated reading instruction with selected digital videos and games focused on basic sounds and word pronunciation.

In the final week of April 2023, a post-test was administered to measure the impact of the intervention. The assessment evaluated improvements in

pupils' ability to recognize sounds and pronounce words accurately, providing insights into the effectiveness of the instructional approach.

Table 1:
Demographic Characteristics by Condition

Characteristics	Category	N	Experimental	N	Control
Gender	Male	40	25%	40	25%
	Female	40	25%	40	25%
Age	6-7 years	58	36.25%	22	13.75%
	8-9 years	22	13.75%	58	36.25%
Class Level	Standard one	48	30%	32	20%
	Standard two	32	20%	48	30%
Schools	School A			80	50%
	School B	80	50%		

Note: Demographic characteristics according to gender, Age, class level and school

Measures

Spelling Skills in Pupils

To evaluate pupils' spelling skills, we designed a standardized test based on the format of the review questions from the 2018 Standard One Pupil textbook published by the Tanzania Institute of Education (TIE). TIE, a Parastatal Organization under the Ministry of Education and Vocational Training (MoEVT), is responsible for ensuring education quality in Tanzania at the preschool, primary, secondary, and teacher training levels. Before the test was given to pupils, the researcher assessed its reliability to ensure consistency.

Reliability Statistic

The alpha coefficient for the six items measuring the spelling skills was .948, suggesting that the items have relative consistency. A reliability coefficient of .70 or higher is considered "acceptable" in most social science research situations (see Table 2).

Table 2:
Cronbach's Alpha of the Items

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Spelling	10.88	51.144	.846	.938
Spelling	11.04	50.261	.917	.929
Spelling	10.92	51.990	.821	.941
Spelling	11.37	55.487	.875	.936
Spelling	11.26	57.177	.738	.949
Spelling	11.37	55.386	.883	.935

Note: The items have relatively high reliability with Cronbach's alpha $\alpha=.948$

This indicates high consistency of the responses.

Statistical Analysis

Data analysis was conducted using SPSS Statistics software, version 30. Two datasets containing identical variables were merged into a single file for analysis. To examine the relationship between the use of digital media (specifically video clips) and the enhancement of spelling skills among lower primary school pupils, a Univariate General Linear Model (GLM) was employed. This statistical method was selected due to the equal sample sizes in both the control and experimental groups, which ensured a relatively homogeneous population, which is an important assumption for the reliability of the GLM results. Unequal sample sizes can compromise the validity of the p-value and, therefore, were intentionally avoided.

Before performing the GLM analysis, preliminary tests were conducted to ensure that key statistical assumptions, including linearity and homogeneity of variances, were met. To assess the homogeneity assumption, Levene's Test for Equality of Variances was applied (see Table 4). The test evaluated the null hypothesis that the variances of the groups were equal. Additionally, the linearity of the relationship between the independent variable (use of digital media) and the dependent variable (spelling skills) was examined to confirm the appropriateness of the GLM approach.

Findings

The means and standard deviations for sound-spelling skills were reported as follows: At **Time 1 (T1)**, the control group scored ($M = 8.8$, $SD = 6.0$), while the experimental group scored ($M = 14.3$, $SD = 7.6$). At **Time 2 (T2)**, the control group had a mean score of ($M = 10.3$, $SD = 7.2$), and the experimental group scored ($M = 17.5$, $SD = 7.4$). These results are presented in **Table 3** and illustrated in **Figure 1**.

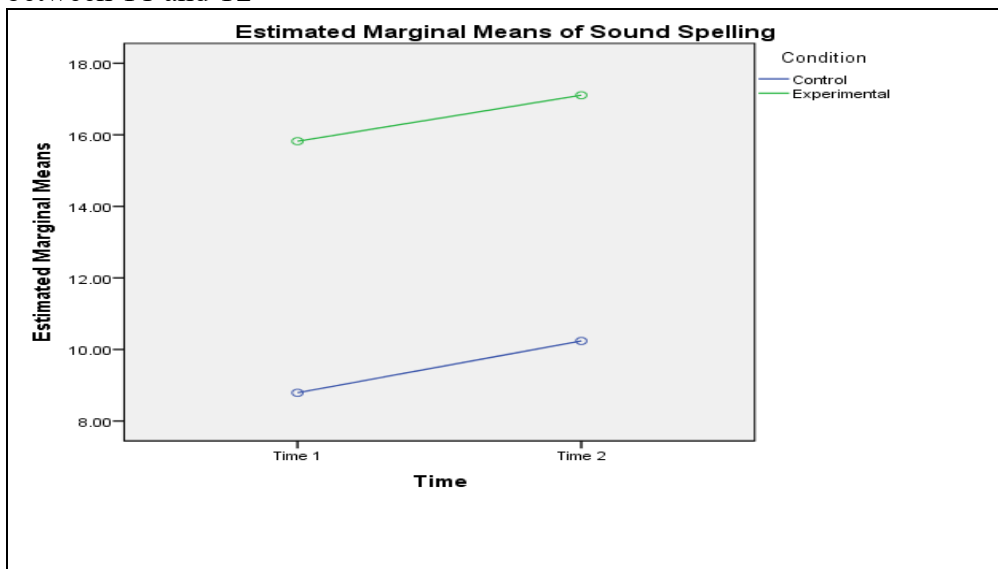
Table 3:

Mean and Standard deviation of Sound Spelling skills between T1 and T2

Condition	Time	M	SD
Control	Time 1	8.8316	5.98048
	Time 2	10.3215	7.23235
Experimental	Time 1	14.3395	7.62888
	Time 2	17.4826	7.38339

Note: Mean of Sound Spelling for the experimental group and control group between T1 and T2

Figure 1: Mean of Spelling for the Experimental Group and Control Group between T1 and T2



Levine's Test of Homogeneity Assumption of Variance

Levine's Test for the Spelling indicates that the null hypothesis was maintained, showing equal error variance between T1 and T2 for the Sounds Spelling $F(3,316) = .992, p = .397$. The p -values being greater than $p > .05$ means that the homogeneity assumption of the variance was met (See Table 4).

Table 4
Levene's Test of Error Variances

Dependent Variable: Spelling			
F	df1	df2	Sig.
.992	3	316	.397

Note: *Levine's Tests suggested the null hypothesis that the error variance of the dependent variable is equal across groups was not statistically significant at $p > .05$; thus, the homogeneity assumption of the variance was met*

Correlation between Gender, Age, Class Level, and Spelling Skills

The correlations between gender, age, class level, and spelling skills were generally weak and statistically non-significant. However, a statistically significant positive correlation was found between pupils' age and improvement in spelling skills, $r(160) = .217, p = .001$. This suggests that age may be associated with enhanced spelling performance, possibly because older pupils within the sample were more motivated or better able to engage

with videos and digital games during learning. These results are presented in **Table 5**.

Table 5
Correlation between Gender, Age, Class level and Sound Spelling

	1	2	3
1. Gender			
2. Age of the participants	-.007		
3. Class level	.899		
4. Spelling skills	-.039	.075	
	.483	.178	
	-.083	.217**	.044
	.139	.000	.429

**Correlation is significant at the 0.01 level (2-tailed)

Uni-variate General Linear Model output

The output from the Univariate General Linear Model revealed a statistically significant linear relationship between the duration of digital media (video clip) use and sound-spelling skills. The effect was statistically significant at the pupil (participant) level, $F(1, 313) = 85.90, p < .001$, partial $\eta^2 = .215$, indicating a moderate effect size. In contrast, the effects at the class and school levels were not statistically significant. These results are detailed in **Table 4.6**.

Table 6: Univariate General Linear Model Output

Tests of Between-Subjects Effects

Dependent Variable: Spelling Skills

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	6802.565 ^a	6	1133.761	29.849	.000	.364
Intercept	15728.730	1	15728.730	414.100	.000	.570
School Level	.499	1	.499	.013	.909	.000
Class Level	30.940	1	30.940	.815	.367	.003
participants	3262.421	1	3262.421	85.892	.000	.215
Condition	2723.832	1	2723.832	71.712	.000	.186
Time	105.120	1	105.120	2.768	.097	.009
Condition * Time	.375	1	.375	.010	.921	.000
Error	11888.657	313	37.983			
Total	62488.222	320				
Corrected Total	18691.222	319				

a. R Squared = .364 (Adjusted R Squared = .352)

Discussion

This intervention confirmed a clear difference in spelling performance between pupils exposed to video clips and those not. Pupils who used video clips as part of their learning process significantly outperformed their counterparts in the control

group. The findings also revealed a statistically significant linear relationship between using digital media (specifically video clips) and improving writing skills, particularly spelling, among lower primary school pupils.

In alignment with existing literature, this study supports the growing body of evidence on the benefits of integrating video clips into both classroom and out-of-classroom learning environments. The experimental group showed higher mean performance scores than the control group, reinforcing the effectiveness of video-based instruction in developing spelling skills.

These findings are further supported by the Cognitive Theory of Multimedia Learning (Mayer, 2008), which explains how learners construct knowledge by selecting, organizing, and integrating verbal and visual information. Video clips facilitate this process by offering dynamic, engaging content that strengthens memory and comprehension, especially in foundational literacy. In today's digital learning environment, pupils are more responsive to multimedia formats such as videos, audio, and graphics than traditional print-based resources. This interactivity enhances motivation and learning outcomes in spelling instruction.

The current findings also align with prior research. For instance, Ahmad *et al.* (2021) and Felanie (2021) found a positive relationship between video clips and improved spelling skills among pupils. Similarly, Alemi, Givens, and Rezanejad (2022) demonstrated that digital storytelling significantly improved writing attitudes among English as a Foreign Language (EFL) learners in Iran. About their work, the present study suggests that incorporating digital media, particularly video clips, into writing instruction may substantially benefit lower primary pupils' spelling development.

In light of these results, it is recommended that the Tanzanian government take deliberate steps to support primary school teachers by providing access to digital devices and stable internet connectivity. These resources facilitate the integration of video clips into daily instruction and demonstrate a strong commitment to improving foundational literacy nationwide.

Strengths, Limitations, and Future Directions

This study makes a distinctive contribution to educational research in Tanzania by focusing specifically on the impact of digital media, particularly video clips, on spelling skills among lower primary school pupils in Dodoma City. The findings offer practical insights into how such tools can effectively support literacy development.

One strength of the study lies in its potential implications for curriculum reform, particularly in integrating digital content into literacy instruction. The results also highlight opportunities for funding from donors and education stakeholders to supply schools with essential digital resources, including computers, projectors, televisions, and tablets.

However, the study is not without limitations. The short intervention period may have constrained the full potential impact of digital media integration. Moreover, the intervention revealed a significant challenge: many teachers lacked the confidence and technical skills to utilize digital media effectively. While the findings are promising, the study's small sample size limits the generalizability of the results. Future research should consider a larger, more diverse sample and a longer intervention period to assess long-term effects better.

Looking ahead, it is clear that science and technology must play a more central role in Tanzanian primary education. Using video clips to teach spelling is effective and essential in preparing pupils for a digitally driven world. As such, government action is urgently needed to equip teachers with the tools and training necessary to implement digital media in literacy instruction. Doing so will mark a significant step forward in strengthening the country's education system and improving learning outcomes for all pupils.

Conclusion and Recommendations

This study underscores digital media's vital role, particularly video clips, in enhancing writing skills, with a specific focus on spelling, among lower primary school pupils. The findings demonstrate that integrating video clips into classroom instruction significantly improves pupils' spelling abilities, especially within Tanzanian education.

In response to these findings, it is recommended that policymakers, curriculum developers, educators, and other education stakeholders actively promote the integration of video clips into literacy instruction. This approach can enrich pupils' learning experiences and contribute meaningfully to developing foundational writing skills.

To support this integration, digital media should be formally recognized as essential instructional tools in primary education. At the school level, government financial planning should prioritize allocating resources for acquiring digital equipment such as projectors, televisions, computers, and tablets. Investment in such infrastructure is critical for creating technology-enhanced learning environments that support literacy development.

In addition, a comprehensive strategy for teacher training is essential. The government should implement robust capacity-building programs for both pre-service and in-service teachers, focusing on digital literacy and the effective pedagogical use of digital media. Equipping teachers with the necessary skills and confidence to integrate video clips and other media into literacy instruction will be vital for sustained success.

Future research should also consider extending the duration of interventions to maximize the impact of video-based learning on spelling mastery. Longer intervention periods may yield more comprehensive results and ensure deeper learning. Furthermore, it is recommended that educators encourage using interactive and visually engaging tools, such as video clips, digital games, and educational apps, during writing lessons. These tools can help maintain pupils' attention and motivation while providing multisensory learning experiences reinforcing spelling skills.

In conclusion, the findings of this study advocate for the strategic and systemic integration of digital media into early-grade literacy instruction. Doing so has the potential to significantly enhance the spelling and overall writing proficiency of lower primary school pupils and contribute to broader improvements in foundational education in Tanzania.

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