



The Use of Digital Media in the Development of Arithmetic Skills in Lower Primary in Tanzania

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Abstract: *This study explored the use of digital media (videos, digital games) in the development of arithmetic skills (number identification, addition, subtraction) in a lower primary (standard one and standard two) in Tanzania. The hypothesis assumed a statistically significant linear relationship between the use of digital media and the development of arithmetic skills in the lower primary. The stratified sampling technique was used to select 160 pupils with F-grade scores in continuous assessment from two public schools in Dodoma City. The experimental group comprised 80 pupils and the control group had 80 pupils. The cognitive theory of Multimedia Learning guided the study, as it emphasises the significance of digital media like videos and digital games in learning. The Multivariate General Linear Model displayed a statistically significant relationship between the use of digital media (video and digital games) and the development of arithmetic skills (Number identification, addition, subtraction) among the lower primary in Tanzania. The study also confirmed that the mean difference between T1 and T2 within pupils in arithmetic skills was also statistically significant because the experimental group demonstrated higher test scores than the control group, indicating the positive effect of videos and digital games on the pupils' number identification, addition, and subtraction skills. The study recommended that policymakers, curriculum developers, teachers, and other educational stakeholders consider incorporating digital media (videos, digital games) in teaching arithmetic skills among lower primary pupils.*

Keywords: *Media, Digital media, Development, Arithmetic skills, Lower Primary.*

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1. Introduction

Arithmetic skills are essential in elementary education as they provide students with fundamental knowledge and logical thinking abilities (Azucena et al., 2022; Kunhertanti & Santosa, 2018). It is through arithmetic that science and technology education can be imagined in the whole aspect of transforming the national economy increasing peoples' ability to reason and analyze abstract phenomena (Samwel, Mulenga & Angel, 2016). Despite the significance explained by various scholars about arithmetic skills, many pupils still struggle with number identification, addition, and subtraction in the early stages of primary school (Casimir, 2019). According to UNESCO (2017), over 387

million primary pupils worldwide, including 202 million in Sub-Saharan Africa, fail to successfully attain basic arithmetic skills by the time they complete primary education. In Tanzania, only 49% of students can correctly answer arithmetic questions related to number identification, addition, and subtraction (Hennessy, Vignoles & Watson, 2021). Reports by Mazana et al., (2020), Mwanahanja and Tilya (2020), Njiku (2019), and Sumra and Katabaro (2014) indicate that approximately 50% of Tanzanian primary pupils who took the Primary School Leaving Examination (PSLE) between 2010 and 2017 performed poorly in number identification, addition and subtraction. This poor performance may be attributed to inadequate preparation in basic skills, particularly in

number identification, addition, and subtraction (Casimir, 2019). The Tanzanian government has made several attempts to address the issue of poor performance in arithmetic. Some of these initiatives include enhancing teachers' pedagogical content knowledge through training, using participatory learning approaches, providing adequate teaching and learning resources, and offering training to arithmetic teachers (USAID, 2018). However, these efforts have been unsuccessful (Sumra & Katabaro, 2014; Fisser, Kafyulilo, Pieters, & Voogt, 2015). Despite numerous efforts to improve arithmetic skills in lower primary, the government has not utilized effectively digital media to promote arithmetic skills although the Tanzania ICT policy has addressed its significance (URT, 2007, Kafyulilo, 2015). Murith and Yoo (2021) suggested that incorporating digital media such as video and digital games in the teaching and learning process enhances pupils' ability to reason and promote efficacy in arithmetic skills. Rensi, Rachmiazasi, Nurmawati, and Edy (2020) who investigated the use of digital media in enhancing mathematics (fraction skills) among fourth-grade pupils in Indonesia, similarly confirmed that the use of digital media increased the score of the experimental group than the control group, indicating that digital media was more effective teaching approach in fractions skills compared to conventional methods. Additionally, Watson (2021) also conducted a similar study on the relationship between educational television and math proficiency among primary pupils in Tanzania. The literature exposed a significant association between educational television and math proficiency. This suggested that television programs, like the Ubongo Kids cartoon, provide opportunities for pupils to grasp difficult concepts in mathematics when learning in the classroom. Therefore, exploring the use of digital media (videos, digital media) in developing arithmetic skills (number identification, addition, subtraction) in lower primary pupils in Tanzania is prominent.

1.1 Statement of the problem

The passage addresses the persistent challenges associated with number identification, addition, and subtraction skills among primary school pupils in Tanzania, as evidenced by recent scholarly inquiries (Mazana et al., 2020; Mwanahanja and Tilya, 2020; Njiku, 2019). It observes that efforts to enhance educators' pedagogical content knowledge, instructional approaches, and educational materials have not comprehensively resolved this issue (USAID, 2018). In addition, there is limited awareness regarding the potential utilisation of digital media, including video and digital games, to enhance arithmetic competencies, regardless of its significance in Tanzania's ICT policy (URT, 2007). The primary objective of the

study is to explore the viability of digital media for developing arithmetic skills among lower primary pupils.

1.2 The purpose of the study

To explore the use of digital media (videos, digital games) in the development of arithmetic skills (number identification, addition, subtraction) in a lower primary (standard one and standard two) in Tanzania

1.3 Research hypothesis

The hypothesis assumes a statistically significant linear relationship between the use of digital media and the development of arithmetic skills in the lower primary.

1.5 Significance of the Article

The study would inform the policymakers, curriculum developers, teachers, and other educational stakeholders of the advantages of incorporating digital media (videos, digital games) in teaching arithmetic skills among lower primary pupils.

2. Literature Review

2.1 Related Literature and Studies

Kaila, Kurvinen, Laakso, and Salakoski (2019) conducted a study to examine the impact of long-term technology-enhanced learning (TEL) on mathematics learning performance in Finland. The study encompassed five streams in second-grade classes, with two classes comprising the treatment group and the remaining three forming the control group. The treatment group integrated technology-enhanced learning into one mathematics lesson per week for 18 to 24 months, while the control group did not utilize this approach. Comparative analysis of mathematics performance and fluency tests revealed significantly higher learning performance in the treatment group using technology-enhanced learning compared to the control group. The findings recommend the integration of technology-enhanced learning in mathematics education. Despite the difference in the study area, the current study in Tanzania also utilized standardized tests to compare results between experimental and control groups

Rensi, Rachmiazasi, Nurmawati, and Edy (2020) conducted a study in Indonesia to investigate the use of interactive multimedia in enhancing mathematics (fraction skills) learning outcomes for fourth-grade students. They compared the performance of an experimental group, which used interactive learning media, with a control group

that did not use it, using standardized tests. The results showed that the experimental group had higher mean scores than the control group, indicating that interactive media was more effective in teaching fractions compared to conventional methods. This study focused on the use of digital media to develop number identification, addition, and subtraction skills among lower primary students (first and second graders) in Tanzania, contrary to empirical literature focused on fourth graders

Radwan and Marban (2021) conducted a study on the use of digital media for math learning among primary and secondary students in the Gaza Strip, Spain. The researchers used a sample of 3179 participants and employed the Chi-Square method to analyze the differences between the cluster groups. The results showed significant differences between the cluster that used digital media and the cluster that did not. The use of digital media for learning had a positive impact on students. Their literature review focused on primary and secondary students while our study exclusively focused on lower primary pupils. Additionally, there were differences in the sample size, study location, and methodology, which underscores the necessity of our study.

Umoh, Udo, Muhammad, and Gloria (2023) conducted a study in Nigeria to investigate the impact of Computer-assisted instruction on the development of Numeracy skills among pre-schoolers in the North-East Senatorial District of Jigawa state. The study involved 2401 pre-schoolers, and a number work achievement test was used to evaluate the effectiveness of Computer Assisted Instruction (CAI) on the children's Numeracy skills. The study found that pupils who received Computer-Assisted Instruction performed better in acquiring Numeracy skills such as counting numbers, identifying numbers, and adding numbers compared to those who were taught using traditional chalk-and-talk methods. While the literature's methodology was similar to the existing study, it differed in the specific location of the study. This justifies the need for further exploration of the use of digital media in enhancing arithmetic skills among lower primary students in Tanzania.

Watson (2021) conducted a study to investigate the relationship between the Tanzanian-produced cartoon Ubongo Kids and the mathematical capability of children. The study involved a sample of 38682 children who had television exposure. The researchers used an item response theory model to analyze the children's test responses. The results of the cross-sectional investigation indicated that exposure to educational cartoons by Ubongo Kids was significantly associated with enhanced mathematical capability among Tanzanian children. This suggests that the use of educational cartoons should be considered by

policymakers in resource-constrained contexts. The empirical literature review focused on children with television exposure, while this study specifically targeted children in lower primary grades.

2.2 Theoretical Framework: Cognitive Theory of Multimedia Learning (CTML) Contribution

The Cognitive Theory of Multimedia Learning (CTML) Contribution posits that deeper learning is facilitated when information is presented through multiple channels that include text, audio, video, games, pictures, or graphics rather than text alone (Mayer, 1997). The theory relies on three major concepts Dual channels, Limited capacity, and Active processing. The dual channel explains how the brain processes visual and verbal material separately (Austin, 2009; Mayer & Moreno, 2003), Limited capacity, suggests that the brain has a limited amount of information to process (Mayer & Moreno, 2003), and Active processing, explains that deeper learning occurs when learner's cognitive ability to process, select, organize, and integrate the information (verbal and visual) being presented with prior knowledge (Mayer, 2008). The "Cognitive Theory of Multimedia principle" adds that people learn more deeply from words integrated with pictures than from words alone (Mayer, 2003). Understanding why multimedia learning is powerful, begins with understanding how the brain processes information. According to Mayer, the brain processes information in multiple channels based on how it is presented. Visual information, such as pictures, videos, charts, or printed words, is processed in the visual channel, while auditory information, including spoken words and non-verbal sounds, is processed separately. When learning, new material is first logged in sensory memory then it moves to working memory, where the learner can work with the information in separate channels. Relevant images and words are processed and organized into models to help understand and remember the information. For the text and images to be stored in long-term memory, the learner needs to process and integrate written text with visualizations (Schmidt-Weigand, Kohnert, & Glowalla, 2010). Finally, the learner integrates the visual and auditory models with their prior knowledge and experiences. Once all the material has been combined functionally, the new knowledge can move into long-term memory.

As far as this study is concerned, the use of digital media in the development of arithmetic skills addresses how videos, digital pictures, and digital games can promote deeper learning of number identification, addition, and subtraction skills among the lower primary. Active processing as one of the components in the Cognitive Theory of Multimedia Learning (CTML), expounds that deeper learning occurs when the learner's mind can process, select, organize, and integrate verbal and visual information with prior knowledge to form new arithmetic knowledge (Mayer, 2008). The reasons for this, are digital media motivates pupils to learn arithmetic by incorporating number calculations with, pictures, graphs, and videos (R.

E. Clark & Salomon, 1986). It also stimulates more than one sense at a time, making it more attention-getting and attention-holding new information about arithmetic skills (Mayer, 2003), Digital media presentations also allow interactivity in learning, particularly between pupils and computer-based instructors such as Computer Assisted Language Learning (CALL) (Reeve, 1998). Therefore, the theory supports that, using digital media in arithmetic, simplifies learning and makes it comprehensible thus, provides a robust framework for understanding how such media enhance cognitive processing and retention of arithmetic concepts among pupils (Mayer & Moreno, 1999)

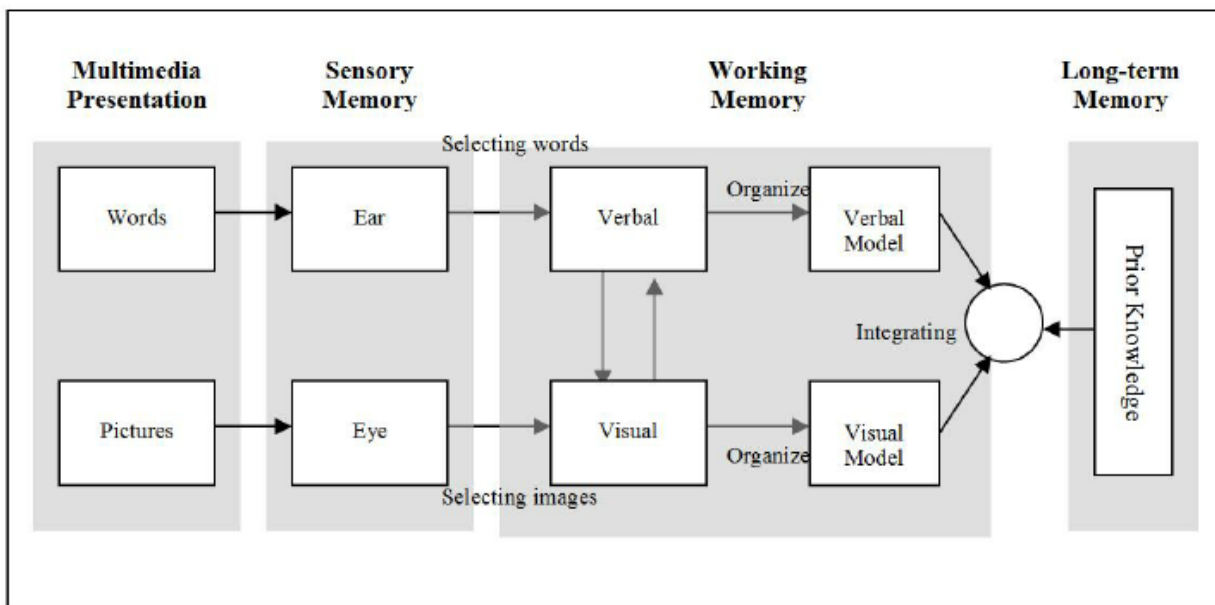


Figure 1: A framework for the cognitive theory of multimedia learning drawn from Mayer (2001)

Note: Active processes, of selecting, organising, and integrating information that comes from words and pictures into the brain and is in a position to give a correct interpretation

3. Methodology

3.1 Participants

The study used a stratified sampling technique to get 160 respondents from two public schools focusing on pupils with consistent F-grade scores in arithmetic as per teachers' records in the continuous assessment. The Quasi-experimental design and stratified sampling technique were used to select 80 respondents in the control group and another 80 in the experimental group. The experimental group participated in an intervention that used digital media such as video and digital games, in arithmetic

classes, while the control group maintained the same traditional learning style. Standardised test was used for data collection and a Multivariate General Linear Model was used for data analysis. In Table 1, it is shown that out of the 160 pupils who participated in the study, 80 were in the control group and 80 were in the experimental group. Among the females, 25% (40) were in the control group and another 25% (40) were in the experimental group. Similarly, the males were also divided into two groups, with 25% (40) in the control group and 25% (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 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.

Table 1: Demographic Characteristics by Condition

Characteristics	category	intervention		control	
		n	%	n	%
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%		

3.2 Data collection procedure

The study was an experiment that aimed to investigate the use of digital media such as video and games in helping Tanzanian lower primary pupils develop arithmetic skills like number identification, addition, and subtraction. The intervention lasted for 10 weeks and was divided into three phases. In the first phase, a pre-test was given to all pupils during the first week of February 2023 to evaluate their existing knowledge before introducing digital media. The pre-test consisted of 10 questions: the first five tested number identification, the next three tested additions, and the final two tested subtraction skills. During the second phase, a one-week training was provided to 10 standard one and standard two teachers to educate them on using digital media for teaching arithmetic skills. They were taught how to download relevant videos and games and integrate them into classroom lessons using projectors and laptops connected to the internet. The third phase involved an eight-week experiment where teachers used videos and games to teach number identification, addition, and subtraction skills to students for 40 minutes each day. The arithmetic content was integrated with the digital media. After the experiment, a post-test was conducted in the last week of April 2023 to measure the impact of video games on the pupils' development in arithmetic skills.

3.3 Data analysis procedure

3.3.1 Data Collection Instrument

To evaluate pupils' number identification, addition, and subtraction 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, is a Parastatal Organization under the Ministry of Education and Vocational Training (MOEVT), which is responsible for ensuring education quality in Tanzania at the preschool, primary, secondary, and teacher training levels. The test comprised 10 questions that aimed to assess students' abilities in number identification, addition, and subtraction. Before the test was given to pupils, the researcher assessed its validity and reliability to ensure its consistency. To ensure the validity the test was submitted to the supervisors and other expertise to assess the content while the reliability was checked by Cronbach's alpha coefficient (see Table 2)

3.3.2 Reliability of the Instrument items

The Cronbach's alpha coefficient for the 10 items ($\alpha=.948$) as indicated in Table 2, suggests that the items have relatively excellent consistency. (Note that a reliability coefficient of $\alpha=.70$ or higher is considered "acceptable" in most social science research situations.)

Table 2: Cronbach's alpha of the items

Skills	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Number identification	21.62	165.898	.531	.953
Number identification	22.11	155.957	.741	.944
Number identification	22.32	154.318	.786	.942
Number identification	22.61	152.144	.848	.939
Number identification	22.82	153.282	.850	.939
Addition	22.91	152.024	.891	.937
Addition	22.97	152.313	.889	.937
Addition	23.26	161.577	.819	.941
Subtraction	23.11	164.963	.666	.947
Subtraction	23.22	161.029	.823	.941

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

3.4 Data analysis

We used SPSS Statistics software version 26.0 to merge two data sets with the same variables into one file. We conducted a Multivariate General Linear Model to determine whether there was a statistically significant linear relationship between the use of digital media (video, digital games) and the development of arithmetic skills (number identification, addition, subtraction) among lower primary pupils. We chose this statistical test because our sample sizes were equal, ensuring a homogeneous population. It's important to note that using the Multivariate General Linear Model is not recommended if the sample sizes for each group are not equal, as the p-value would not be reliable. Before conducting a Multivariate General Linear Model, we assessed whether the data met various requirements, such as the homogeneity assumption of the data and the linearity of the variables. To do this, we checked Levene's test to prove the homogeneity assumption of the variance between the variables (see Table 4). Lastly, we used the Multivariate test to assess the linearity of the variables (if the independent variable has a

linear relationship with the dependent variable. (see Table 6)

4. Results and Discussion

4.1 Mean and Standard Deviation of Pupils' Arithmetic Score over time

The finding showed that the mean of the Number identification in T1 was ($M=13.1, SD=7$) for the control group and ($M=11.2, SD=6$) for the experimental group. In T2 ($M=12.6, SD=6.8$) in the control group and ($M=13.5, SD=6.7$) in the experimental group. For Addition skills, the mean of T1 was ($M= 2.8, SD=2.1$) in the control group and ($M=2.6, SD=1.7$) in the experimental group, and T2 the mean was ($M=3.4, SD= 2.2$) in the control group and ($M=3.4, SD=2.1$) in the experimental group. For Subtraction, the mean in T1 was ($M=2.8, SD= 2.1$) in the control group and ($M=2.6, SD=1.7$) in the experimental group while for T2 ($M=3.3, SD=2.2$) in the control group and ($M=3.4, SD=2.1$) in the experimental group (see Table 3, Figure 2,3 and 4).

Table 3: Mean and Standard Deviation of Pupils' Arithmetic Score over time

Skills	Time	Condition	M	SD
Number Identification	Time 1	Control	13.1385	6.99036
		Experimental	11.2297	6.02258
	Time 2	Control	12.5900	6.76999
		Experimental	13.4895	6.70670
Addition	Time 1	Control	2.8173	2.11212
		Experimental	2.5676	1.67848
	Time 2	Control	3.3750	2.19680
		Experimental	3.3991	2.11315
Subtraction	Time 1	Control	2.8173	2.11212
		Experimental	2.5676	1.67848
	Time 2	Control	3.3750	2.19680
		Experimental	3.3991	2.11315

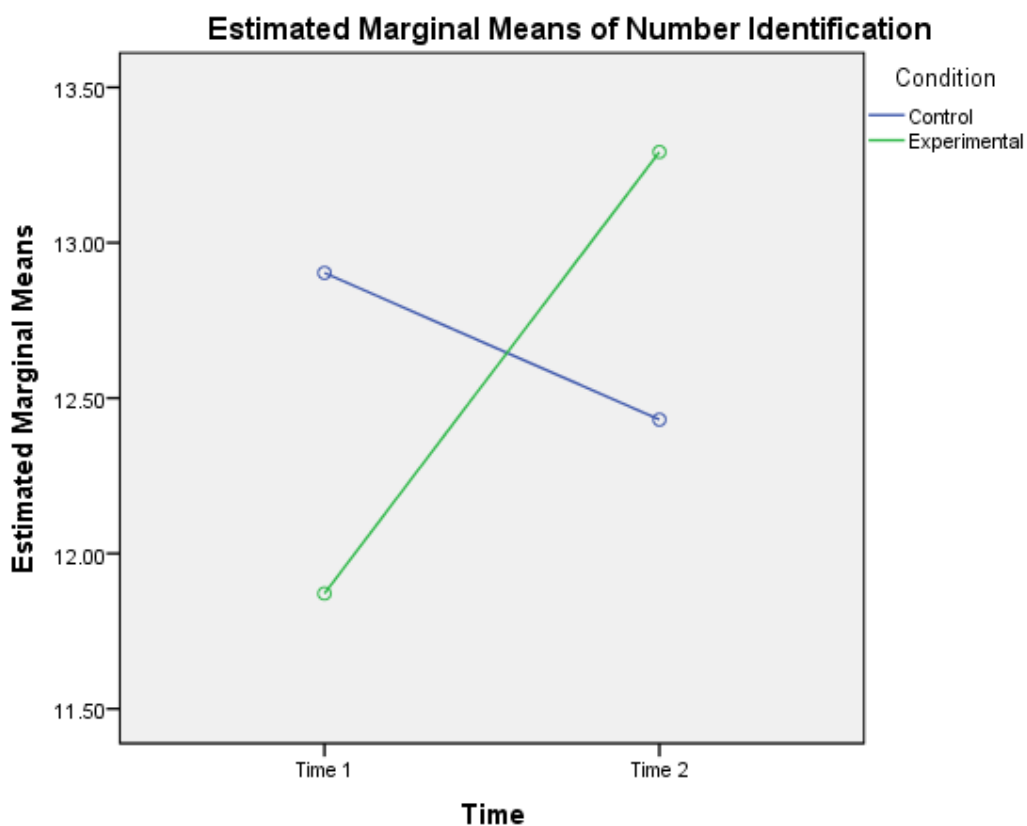


Figure 2: Mean of Number Identification

Note: Pupil number identification development for the experimental group and control group at T1 and T2

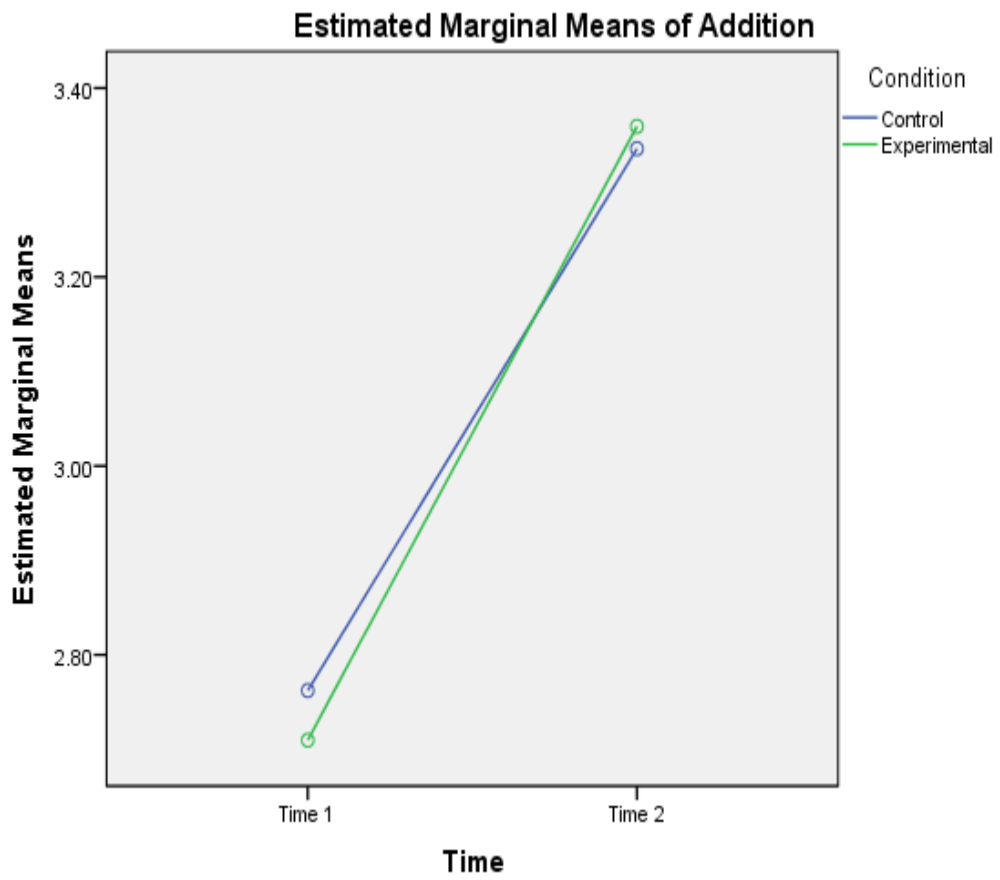


Figure 3: Means of Addition

Note: Pupils' addition skills development for the experimental and control group in T1 and T2

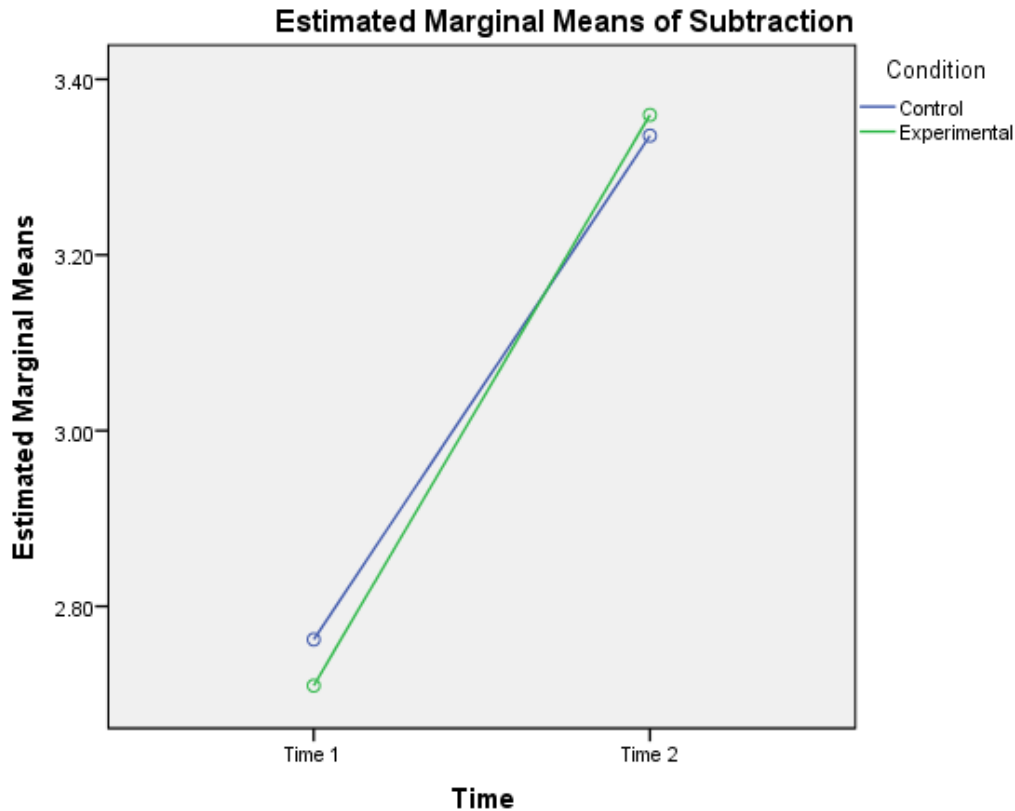


Figure 4: Means of Subtraction

Note: Pupils' subtraction skills development for the experimental and control group in T1 and T2

4.2 Levene's Test of Equality of Error Variances

Levine's Test indicates that the null hypothesis was maintained, showing equal error variance between T1 and

T2 for Number Identification $F(3,316) = 0.116, p = .950$, Addition $F(3,316) = .198, p = .117$, and Subtraction $F(3,316) = 1.98, p = .117$. 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 Equality of Error Variances

	F	df1	df2	Sig.
Number Identification	.116	3	316	.950
Addition	1.981	3	316	.117
Subtraction	1.981	3	316	.117

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.

4.3 Correlations among Study Variables

Table 5 shows the statistically significant relationships between pupils' arithmetic variables (number

identification, addition, subtraction) and pupils' gender but no correlation between arithmetic variables (number identification, addition, subtraction) with age and class level

Table 5: Correlations among Study Variables

	1	2	3	4	5
1.Gender					
2.Age of the participants	-.572**				
3.Class level	.000				
4. Number Identification	-.572**	.211**	.111	.111	
5.Addition	.007	.163	.163		
6. Subtraction	.215**	-.116	-.116	.173*	
	.006	.143	.143	.028	
	.175*	.105	.105	.164*	.331**
	.027	.187	.187	.038	.000

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

**. Correlation is significant at the 0.05 level (2-tailed).*

4.4 Multivariate General Linear Model

The Multivariate General Linear Model displayed a statistically significant linear relationship between the use of digital media (videos and digital media) and the development of arithmetic skills (number identification,

addition, subtraction) within pupils (Participants) on Number Identification $F(1, 314) = 91.72; p < .0005$; partial $\eta^2 = .23$; addition $F(1, 314) = 42.5; p < .0005$; partial $\eta^2 = .12$ and $F(1, 314) = 42.5, p < .0005$; partial $\eta^2 = .12$ for Subtraction. There was no statistically significant effect of the Test at class level $p > .0005$ and school type $p > .0005$. (see Table 6)

Table 6: Tests of Between-Subjects Effects

Source	Skills	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Condition	Number Identification	.926	1	.926	.027	.870	.000
	Addition	.003	1	.003	.001	.976	.000
	Subtraction	.003	1	.003	.001	.976	.000
Time	Number Identification	30.511	1	30.511	.886	.347	.003
	Addition	29.016	1	29.016	7.879	.005	.024
	Subtraction	29.016	1	29.016	7.879	.005	.024
School Type	Number Identification	2.469	1	2.469	.072	.789	.000
	Addition	.007	1	.007	.002	.964	.000
	Subtraction	.007	1	.007	.002	.964	.000
Class Level	Number Identification	3.144	1	3.144	.091	.763	.000
	Addition	5.635	1	5.635	1.530	.217	.005
	Subtraction	5.635	1	5.635	1.530	.217	.005
Participants	Number Identification	3158.138	1	3158.138	91.721	.000	.226
	Addition	156.466	1	156.466	42.490	.000	.119
	Subtraction	156.466	1	156.466	42.490	.000	.119
Error	Number Identification	10811.671	314	34.432			
	Addition	1156.296	314	3.682			
	Subtraction	1156.296	314	3.682			

a. R Squared = .232 (Adjusted R Squared = .220)

b. R Squared = .150 (Adjusted R Squared = .136)

Discussion of Findings

Digital Media and Development of Arithmetic Skills

The current research on the intervention found that there was a statistically significant linear relationship between the use of digital media (videos, digital games) and the development of arithmetic skills (number identification, addition, subtraction) amongst lower primary pupils in Tanzania. The results provided valuable evidence that videos and digital games positively affect number identification, addition, and subtraction skills. In comparison to existing literature, this study also revealed positive aspects of using videos and digital games in the

classroom and outside classroom for developing arithmetic skills. Also, our research findings confirm that there is a significant mean difference between the experimental group and the control group whereby the experimental group displayed a higher mean than the control group. The average performance of the experimental group demonstrated the greater effectiveness of videos and digital games compared to the control group. Today, pupils are more fascinated by digital media such as audio, images, and video, making the arithmetic class more engaging than traditional printed books. Videos and digital games are especially beneficial in helping pupils learn new ideas about number identification, addition, and subtraction.

Studies by Rensi, Rachmiazasi, Nurmawati, and Edy (2020) compared pupils using traditional learning methods

with those using digital media (videos, digital games, pictures), and found a significant relationship between videos, digital games, and arithmetic skills (number identification, addition and subtraction). This is because these media offer stimulating activities that engage pupils more than traditional methods. Additionally, videos and digital games are particularly attractive to younger pupils, many of whom are visual learners. For slower learners in lower primary, videos, and digital games can be more encouraging than printed books, as they provide visual media such as animation, sounds, and narration, thereby enhancing interactivity. This not only improves pupils' arithmetic skills but also entertains and motivates them to engage more (Sorden, 2013).

Umoh, Udo, Muhammad, and Gloria (2023) from Nigeria investigated the impact of Computer-Assisted Instruction on the development of numeracy skills among preschoolers in the North-East Senatorial District of Jigawa. The results suggested that pupils who received Computer-Assisted Instruction performed better in acquiring numeracy skills, such as counting numbers, identifying numbers, and adding numbers, compared to those who were taught using traditional methods like chalk-and-talk. The findings resembled this study as it highlights the importance of digital media such as videos and digital games in enhancing learning outcomes for primary school pupils. The results confirmed that using digital media can improve pupils' performance, particularly in grasping number identification, addition and subtraction skills. The research study suggests that incorporating digital media in teaching, particularly through videos and digital games, can benefit lower primary pupils by boosting their confidence and motivation, thereby aiding in their arithmetic skills development. Therefore, it is recommended that the Tanzanian government take immediate and deliberate steps to support primary teachers with digital facilities and internet access to facilitate the use of videos and digital games in teaching arithmetic skills and to show a strong commitment to the future of Tanzanian education

Limitation, and Future Direction

The study conducted in Tanzania is the first to explore the use of video and digital games to improve number identification skills, addition, and subtraction among lower primary pupils in Tanzania. The findings of the study shed light on the lack of previous research on the use of digital media (video and digital games) in the development of arithmetic skills in the lower primary in Tanzania. The results emphasise the importance of incorporating video and digital games in the education of lower primary in Tanzania. Additionally, the study suggests the need for more training and workshops for primary teachers on the use of videos and digital games for teaching number identification, addition, and subtraction skills. It also highlights the necessity for the government to consider

purchasing digital facilities such as computers, projectors, televisions, tablets, and the internet to help lower primary teachers easily download videos and digital games when teaching pupils number identification, addition, and subtraction skills. However, the study also identified challenges, including the need for more time for intervention and the lack of proficiency among primary school teachers in using videos and digital games in the classroom context. The study suggests that the generalization of its findings would be more robust with a larger sample size. In conclusion, due to the advancements in science and technology, the study emphasizes the significance of video and digital games in developing pupils' number identification, addition, and subtraction skills. The study also urges the Tanzanian government to buy more digital facilities and provide training to teachers to develop arithmetic skills (number identification, addition, and subtraction skills) in lower primary.

5. Conclusion and Recommendations

To improve number identification, addition, and subtraction skills among lower primary in Tanzania, it is recommended that policymakers, curriculum developers, teachers, and other education stakeholders consider using video and digital games as important instructional tools. Therefore, it is important to prioritize the availability of video and digital games in classrooms as part of the teaching materials used in primary schools. The government budget should consider obtaining digital facilities such as projectors, televisions, computers, tablets, and the Internet to help teachers access videos and digital games for teaching number identification, addition, and subtraction skills. Additionally, the government should organize capacity-building training for both in-service and pre-service primary teachers on the use of digital media to facilitate number identification, addition, and subtraction skills. This study provides an overview of the use of digital media (video and digital games) in teaching arithmetic skills (number identification, addition, and subtraction) to lower primary pupils in Tanzania. Given the predominantly positive findings regarding the use of video and digital games in developing arithmetic skills, it is the right time to take critical steps and begin using videos and digital games to improve arithmetic skills (number identification, addition, and subtraction) in the lower primary in Tanzania.

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