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Management of the Blended Learning Approach and Pupils' Numeracy Skills in Public Primary Schools: Evidence from Alimosho Local Government Area, Lagos State

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Abstract

This study investigated the management of blended learning and its influence on pupils' numeracy skills in primary schools in Lagos State, Nigeria, focusing on Alimosho Local Government. Guided by four research questions and hypotheses, it adopted a descriptive survey design. The population comprised teachers with 180 respondents selected via purposive and simple random sampling. Data were collected using a self-developed questionnaire, Management of Blended Learning Approach on Numeracy Skills of Primary School Pupils Questionnaire (MBLAMPP), validated by experts and reliable at 0.87 through test-retest. Data were analyzed with descriptive statistics and Pearson Product Moment Correlation at 0.05 level of significance. Results showed a strong positive significant relationship between availability of blended e-learning and numeracy skills ($r=0.68$, $p<0.05$) and a moderate positive significant relationship for accessibility ($r=0.61$). Conversely, teacher-related challenges ($r=-0.58$) and school management challenges ($r=-0.60$) showed moderate negative significant relationships with numeracy skills. The study concludes that effective management of blended learning improves numeracy when infrastructure, accessibility, teacher capacity, and institutional support are present. It recommends government and stakeholders provide ICT facilities, internet, continuous teacher training, technical support, and inclusive strategies like shared devices and data subsidies to enhance learning outcomes in primary schools effectively.

Keywords: Blended Learning Approach, Numeracy Skills, Digital Literacy, Infrastructure, ICT Access.

Introduction

The rapid evolution of technology in the 21st century has transformed the landscape of education, with digital tools playing an increasingly critical role in teaching and learning processes. One of the most promising innovations is the blended learning approach, which integrates traditional face to face instruction with online and technology-based methods. This model has demonstrated significant potential to improve learning outcomes by offering flexibility, personalization, and enhanced student engagement (Adedoyin & Soykan, 2020; Boelens et al., 2023). The purpose of introducing these new innovative practices of blended learning as teaching strategies and methods for quality teaching is to improve student academic performance and outcomes thereby addressing real problems to promote equitable learning (Gbesoevi et al., 2025).

On the other hand, numeracy skills are seen as the ability to apply mathematical concepts in practical contexts, which are fundamental to pupils' cognitive development and future academic success. These skills are especially crucial in the early years, as they form the foundation for critical thinking and problem-solving abilities (Dowker, 2020). However, various assessments, such as the Universal Basic Education Commission (UBEC) national learning assessments, have consistently revealed poor numeracy performance among Nigerian primary school pupils (UBEC, 2022). Also Studies in the past have focused a great deal on pupils' factors in predicting pupils' academic performance (Oyelami et al., 2024). The causes ranges from teacher centered-pedagogy, lack of digital infrastructure, insufficient instructional materials, large class sizes and untrained teachers (Onyema et al., 2021; Olanrewaju & Adebayo, 2023). However, leveraging on management of digital tools such as interactive learning platforms, educational apps, and virtual reality simulations, and online resources, educators can create dynamic and personalized learning experiences for students and pupils (Gbesoevi et al., 2024). The management of this tools and their application alongside with traditional approach in teaching the pupils considering the peculiarity of the nature of primary school environment where there are infrastructural deficits and constrains can and may likely affect the pupils' numeracy skills, compare to the higher education environment where these tools are available and utilized, hence the need for the adoption and application of the blended learning approach.

The blended learning approach combines traditional classroom teaching with an e-learning system. The application of Moodle as a learning platform enhances educational interaction and helps teachers understand pupils' personal aptitudes and academic achievements. Blended learning, when effectively managed, presents a promising pathway to bridge these gaps by combining the structural methods with the dynamism of digital content. Management in this context involves strategic planning, teacher training, resource mobilization, learner support, and continuous monitoring and evaluation (Almahasees et al., 2021). Poorly managed blended learning programs, however, may not improve outcomes and can even exacerbate existing inequalities. Numeracy skills are likely achievable if the combinations of traditional approach to teaching and e-learning approach to teaching is effectively applied and managed.

Literature Review/Theoretical Underpinning

The theoretical anchorage for this article is constructivist theory of learning developed by Jean Piaget John Dewey and Lev Vygotsky between 1920s to 1950s. This theory is used to contextualize management of blended learning on numeracy skills of pupils in primary schools (Basic 3 to Basic 6) to fill in gaps as identified by

Universal Basic Education Commission (UBEC, 2022). Constructivism assumes that pupils are the active creators of knowledge based on experiences and reflection rather than the passive receivers of teacher delivered data. It is based on the contributions of Piaget, Vygotsky and Dewey focused on the pupil centered method according to which the teacher guides learning by engaging with students, communicating with them, and exploring different contexts, which is suitable in the sphere of numeracy education in blended settings.

Cognitive constructivism by Piaget is concerned with mental processes of individuals, which implies that pupils build mathematical knowledge through assimilation of the new experiences into old schema and adapting them in the presence of new information. Cognitive conflicts through problem-solving activities such as investigating number patterns in numeracy stimulate schema refinement and conceptual development, and are aided by self-paced online learning tools such as GeoGebra. Constructivism by Vygotsky emphasizes interaction with others and the cultural background, especially using the Zone of Proximal Development (ZPD), in which learning is guided by a teacher or peer students that is online forums or apps, or classroom discussions. Pupils may as an example, work with word problems in small groups, and develop the ideas of one another in the ZPD.

Blended learning supports these principles through the creation of active, collaborative, and personalized learning experiences that apply to the primary school pupils in Lagos. On line activities, like videos, quizzes, and simulations, allow pupils to learn about numeracy concepts, such as operations or measurement, independently, and classroom time is devoted to practical work with manipulative, such as counting blocks, to learn. These blends encourage critical thinking and mastering of concepts since pupils can go online and takes their time; and reflect together in real life. Studies indicate that constructivist blended methods have positive effects on academic achievement, including in physics, and can have correspondingly successful numeracy outcomes, and Nigerian research affirms the beneficial effects of math performance using blended methods with no gender biases

Umoh and Akpan (2014) opted that blended learning is an innovative approach for delivering electronically mediated, well-designed, learner-centered and interactive learning environment to anyone, anytime by utilizing the internet and digital technologies in concern with instructional design principles. Broadly speaking, e-learning is a network technology-based mode of education that uses a mix of computer and other ICTs, across time, and place constraints to deliver instruction and provide access to information resources. Thus, the use of e-learning technologies gives teachers the diversity of their teachings, displaying more information and enhancing pupils learning. Therefore, management of blended approach involves a combination of conventional face to face and online technology bases learning (Wang, 2017). According to Yushu (2021), blended learning mixes various event-based activities, including face to face classroom, live e-learning and self-paced learning. This often is a mix of conventional instruction led training, synchronous online conference, training, or asynchronous self-pace study.

Gbesoevi et al., (2022) presupposes that planning and integration of Information and Communication Technology (ICT) plays a significant role in impacting education in modern scenarios. In Nigeria, particularly in Lagos State, a highly urbanized and educationally dynamic region, there is a growing recognition of the need to adopt innovative teaching strategies that align with global educational standards. The Lagos State Government has initiated several ICT-based interventions in education through programs such as the Eko Digital Initiative and the Lagos EdTech Project through the Lagos State Ministry of Education ("Vanguard Newspaper" 2024). Despite these efforts, the implementation and management of blended learning in public primary schools remain inconsistent and needs more attention to be given to. Winarso and Udin (2024) examined the implementation of blended learning

within the Technological Pedagogical and Mathematical Knowledge framework to enhance mathematics teachers' competence using a mixed-methods pre-test and post-test design with primary and junior secondary school mathematics teachers.

In challenging subjects such as mathematics and elementary science, struggling pupils often become frustrated and despondent. Subjects taught using the traditional method moves all pupils through the curriculum at the same pace, regardless of mastery. The classroom teacher often has little time to assist individual pupils, and pupils often have no one at home to turn to for assistance. The end result is pupil frustration, leading to incomplete homework assignments and subsequent poor performances on assessments. The problem is that elementary teachers in local schools may not be implementing blended learning approach as intended by the improvement plan for the school. Despite multiple forms of available technology, it is observed that, elementary teachers in an elementary school in the State are not using blended learning to increase pupil's engagement and improve higher order thinking skills, a stated priority on the district's improvement plan. The existing school improvement plan lists blended learning as an instructional model in which there is a combination of face to face and online learning, as one of the methods for increasing pupils' engagement and improving higher level numeracy skills in school in Lagos State. Hence, there is a need to plan with all stakeholders having technological and innovative input in schools (Gbesoevi & Adeleke 2021)

The gap in practice could among other things be traceable to lack of technology integration in the elementary classroom, despite literature that states this integration is a benefit to pupils'. This gap continues despite the availability of one technology device, such as Chromebook or iPad, per pupil. Researchers suggested that blended learning is an effective method of increasing pupil's engagement and therefore an effective way to integrate as part of the school improvement plan. At the elementary level, technology integration refers to using the digital components included with textbooks, subscriptions to online learning programs, and digital tools for creating documents and presentations. Technology tools such as iPads, laptops, and accounts for software are provided but teachers often do not receive training or guidance on how to use them. Without professional training and clear expectations, technology is integrated inconsistently within schools, hence there is need to investigate the Management of blended learning approach on numeracy skills of primary school pupils in Lagos State. Also is poor computer literacy, another problem the academics are facing is the problem of inadequate ICT facilities. (Gbesoevi et. al., 2023)

Thus, this study seeks to examine the influence of management of blended learning approach in enhancing pupils' numeracy skills in primary school in Lagos State. Specifically, this study examined the following:

i. Examine the perceptions of teachers on the availability of blended e-learning tools on pupils' numeracy skills in primary school in Alimosho Local Government.
ii. To determine the perceptions of teachers on the accessibility of blended e-learning tools on pupils' numeracy skills in public primary school in Alimosho Local Government
iii. Examine the influence of challenges teachers face in implementing blended learning on pupils' numeracy skills development in primary school in Alimosho Local Government.
iv. Examine the relationship between school management challenges in implementing blended learning on pupils' numeracy skills in primary school in Alimosho Local Government.

The following research questions guided this study:

1. What is the extent of availability of blended learning approach for the teaching and learning of numeracy skills of primary school pupils?

2. What is the extent of pupils' accessibility of blended learning tools for the teaching and learning on numeracy skills of primary school pupils?
3. What challenges do teachers and school management face in implementing blended learning for numeracy skills development of primary school pupils in Lagos State?

More so, the following null hypotheses were tested at 0.05 level of significance:

1. There is no significant relationship between availability of blended learning approach in teaching and learning and pupils' numeracy skills in primary schools in Alimosho Local Government.
2. There is no significant relationship between accessibility of blended learning approach in teaching and learning and pupils' numeracy skills in primary school in Alimosho Local Government.
3. There is no significant relationship between Challenges that teachers face in the implementation of blended learning approach and development of pupils' numeracy skills in primary school in Alimosho Local Government.
4. There is no significant relationship between challenges that school management face in the implementation of blended learning approach and development of pupils' numeracy skills in primary school in Alimosho Local Government.

The findings are expected to contribute to educational policy and practice by providing evidence-based recommendations for sustainable and inclusive use of blended learning in primary schools. More so, this study is significant for several reasons, as it contributes to educational theory, policy, and practice. As digital transformation continues to influence education, this study will shed light on the practical integration of technology in primary education. It will guide school administrators and teachers on best practices for managing blended learning environments in resource-constrained contexts. Findings from this study will inform educational policymakers in Lagos State and Nigeria at large on the need to develop frameworks that support the adoption and sustainability of blended learning in primary schools, especially for core subjects like numeracy.

Methodology

The study adopted a descriptive survey research design. The design is appropriate as it enables the researcher to sample opinions of respondents through questionnaire to draw reasonable conclusions on management of blended learning approach and numeracy skills of pupils. The targeted population comprised 360 male and female teachers of Primary 4-6 in the public primary schools in Education District I, precisely Alimosho Local Government Area, Lagos State. A sample size of 180 teachers was determined using Taro Yamane formula $n = N / 1 + N(e^2)$ Where n = sample size, N = 360, e = 0.05 margin of error. Simple random sampling technique was used to give every teacher equal and independent chance of selection.

The instrument for this study was a structured questionnaire and assessment test performance on numeracy skill pupils. The questionnaire was titled "Management of Blended Learning Approach on Pupils Numeracy Skills in Primary School" (MBLAMPNSP Questionnaire) and the instrument contains two sections. Section A covered the bio-data of respondents, while Section B contained 30 items on management of blended learning on pupils' numeracy skills which is in line with the purpose of the study and research hypotheses, measured on a 4-point Likert scale: scores accordingly Very True (4), True (3), Untrue (2), and Very Untrue (1). Face and content validity of the instrument was established by experts in the field of Educational Management and Test, Measurement and Evaluation. More so, the instrument was subjected to test-retest reliability method of two weeks intervals on 20

teachers\respondent that do not form part of the actual sample for the administration of the instrument and the re-administration before the two sets of data administered were collected and analyse through Pearson product moment correlation and the reliability coefficient was 0.87, which implies that the instrument was reliable. The assessment test performance of the pupils' numeracy skills carried out during and after the application of the blended learning approach serves as what was used to determine pupil's numeracy skills. The actual instrument was administered to respondents and data collected were analyzed using descriptive statistics of simple percentage, mean and standard deviation while inferential statistics of Pearson Product Moment Correlation Coefficient (PPMC) was used to test the all the formulated hypotheses at 0.05 level of significance.

Results

A descriptive report was made with the data while the research questions and hypotheses tested were reported. All the hypotheses were tested using the Pearson Correlation. In other to obtained answers to the research question and to test the null hypotheses for the study, a total of one hundred 180 questionnaires were distributed to the respondents and were all retrieved and analyzed.

Table 1: Presentation of Demographic Variables

Demographic Variable		Frequency Count	Percent
Gender	Male	72	40.0
	Female	108	60.0
Age Group	20–29 years	27	15.0
	30–39 years	54	30.0
	40–49 years	63	35.0
	50+ years	36	20.0
Qualification	NCE	27	15.0
	B.Ed/B.Sc(Ed)	72	40.0
	M.Ed/MSc	45	25.0
	PGDE	18	10.0
	Others	18	10.0
Experience	1-5 yrs	45	25.0
	6-10 yrs	18	10.0
	11-15 yrs	27	15.0
	16+ yrs	90	50.0
Pupils Level	Basic 4	57	31.6
	Basic 5	60	33.3
	Basic 6	63	35.1

The analysis reveals that the majority of respondents (60.0%) are female, while males constitute 40.0% of the sample. This gender distribution indicates a predominance of female participants, which may reflect job enrollment patterns. Also, analysis reveals that the largest proportion of respondents (35.0%) fall within 40–49 years age group, followed closely by those aged 30–39 years (30.0%). Together, these middle-aged groups constitute 65.0% of the sample. Younger adults (20–29 years) represent 15.0%, while those aged 50 and above account for 20.0%. This distribution suggests a predominantly middle-aged sample. On the other hand, the demographic distribution of educational qualifications among 180 respondents, revealing a predominance of bachelor's-level education. Specifically, 72 respondents (40.0%) hold B.Ed/B.Sc(Ed) degrees, followed by 45 (25.0%) with M.Ed/MSc qualifications. Lower

frequencies include NCE holders at 27 (15.0%), alongside PGDE and "Others" each at 18 (10.0%). This profile indicates a relatively well-educated sample, with 55.0% possessing at least a bachelor's degree and 35.0% holding postgraduate credentials, which may reflect a focus on professional educators. Additionally, teaching experience among 180 respondents reveals the majority, represented by 90 respondents (50.0%), have more than 16 years of experience, this is followed by 45 respondents (25.0%) with 1-5 years, 27 (15.0%) with 11-15 years, and 18 (10.0%) with 6-10 years. Overall, 75.0% of respondents have more than 5 years of experience, suggesting substantial professional within the sample group. Lastly, the distribution of class levels taught among 180 respondents. The largest group, 63 respondents (35.1%), teach Basic 6, followed by 60 (33.3%) at Basic 5, and at 57 (31.6%) Basic 4.

Table 2. Responses to Research Question One: What is the extent of availability of blended learning approach for the teaching and learning of numeracy skills of primary school pupils?

No.	Statement	VT (4)	T (3)	UT (2)	VUT (1)	Total	Mean	SD
1	The school has sufficient computers/laptops for pupils to use in numeracy teaching.	18 (10.0%)	36 (20.0%)	72 (40.0%)	54 (30.0%)	180	2.2	0.94
2	There are enough mobile devices (e.g., tablets, iPads) to support the digital component of numeracy.	12 (6.7%)	30 (16.7%)	84 (46.7%)	54 (30.0%)	180	2.1	0.86
3	The school has reliable and consistent internet connectivity (Wi-Fi/data) for blended learning activities.	24 (13.3%)	48 (26.7%)	60 (33.3%)	48 (26.7%)	18_Category: }180	2.5	1.00
4	The school provides access to subscription-based online learning programs for numeracy.	15 (8.3%)	33 (18.3%)	75 (41.7%)	57 (31.7%)	180	2.2	0.91
5	Digital resources (e.g., interactive whiteboards, projectors) are readily available in the classroom for numeracy instruction.	30 (16.7%)	45 (25.0%)	60 (33.3%)	45 (25.0%)	180	2.6	1.03
6	E-assessment tools and platforms are available for evaluating pupils' numeracy skills.	21 (11.7%)	39 (21.7%)	69 (38.3%)	51 (28.3%)	180	2.3	0.97
7	Teachers receive adequate training to integrate blended learning in numeracy lessons effectively.	27 (15.0%)	42 (23.3%)	63 (35.0%)	48 (26.7%)	180	2.5	1.01
8	Blended learning has positively improved pupil engagement and understanding in numeracy.	45 (25.0%)	60 (33.3%)	45 (25.0%)	30 (16.7%)	180	3.0	1.03
9	Government supports the provision of digital resources for blended learning.	18 (10.0%)	36 (20.0%)	72 (40.0%)	54 (30.0%)	180	2.2	0.94

Table 2 responses point toward a strong consensus that blended learning availabity tools in school for pupils' numeracy skills is severely hampered by inadequate digital resources including computers/laptops (mean 2.2), mobile devices (2.1), internet connectivity (2.5), online programs (2.2), and e-assessment tools (2.3) with over 60–77% of respondents disagreeing on their sufficiency, compounded by limited teacher training (2.5) and government support (2.2). Despite these barriers, a notable positive emerges in pupil engagement and understanding (mean 3.0, 58% agreement), indicating potential efficacy if constraints are addressed through targeted investments in infrastructure, professional development, and policy backing to enhance numeracy outcomes. Furthermore, some divergence in views and suggesting that experiences with infrastructure, training, and outcomes of blended learning differ markedly across schools. Overall, while respondents generally perceive blended learning as beneficial for pupil engagement (Item 8), there is widespread concern about the adequacy of digital infrastructure and support systems needed to sustain effective implementation.

Table 3. Research Question Two: What is the extent of pupils' accessibility of blended learning tools for the teaching and learning on numeracy skills of primary school pupils?

	Statement	VT (4)	T (3)	UT (2)	VUT (1)	Total	Mean	SD
1	Pupils can easily access and log in to the school's online learning platforms (e.g., Moodle) for numeracy content.	24 (13.3%)	36 (20.0%)	60 (33.3%)	60 (33.3%)	180	2.3	1.00
2	The available digital numeracy resources are user-friendly for primary school pupils (Basic 3–Basic 6).	45 (25.0%)	54 (30.0%)	51 (28.3%)	30 (16.7%)	180	2.7	1.00
3	Pupils are given enough time in school to practice numeracy skills using the digital tools provided.	15 (8.3%)	30 (16.7%)	75 (41.7%)	60 (33.3%)	180	2.1	0.92
4	Most pupils in my class have access to digital tools (e.g., smartphones, computers) for numeracy learning at home.	18 (10.0%)	36 (20.0%)	72 (40.0%)	54 (30.0%)	180	2.2	0.94
5	The cost of accessing blended learning resources (e.g., data, devices) poses a barrier to my pupils.	69 (38.3%)	54 (30.0%)	39 (21.7%)	18 (10.0%)	180	2.8	0.86
6	Pupils show low digital literacy.	60 (33.3%)	57 (31.7%)	42 (23.3%)	21 (11.7%)	180	2.7	0.95
7	The school provides technical support to pupils when they face difficulties with blended-learning resources.	12 (6.7%)	30 (16.7%)	72 (40.0%)	66 (36.7%)	180	2.0	0.91

Table 3 shows that pupils' access to blended learning approach to numeracy skills is constrained by several interrelated factors. Teachers report that pupils can only partially access and log in to the school online learning platforms, as the mean score of 2.3 and relatively high standard deviation of 1.00 indicate a tendency toward disagreement with substantial variability in experiences across classrooms. Digital numeracy resources are generally perceived as reasonably user-friendly for primary pupils in

Basic 3–Basic 6, with a mean of 2.7 and SD of 1.00, suggesting moderate agreement but some divergence in views. However, pupils are reported to be given insufficient time in school to practice numeracy skills using digital tools, as reflected in the low mean of 2.1 and SD of 0.92, which points to a strong consensus that practice opportunities are inadequate. At home, access to digital tools such as smartphones or computers is also limited, with a mean of 2.2 and SD of 0.94, indicating that most teachers believe many pupils lack the necessary devices for out-of-school learning. Teachers further emphasize that the cost of data and devices poses a significant barrier to accessing blended learning resources, as the relatively high mean of 2.8 and low SD of 0.86 show strong and consistent agreement on this constraint. There is similarly strong consensus that pupils' digital literacy is low, with a mean of 2.7 and SD of 0.95, suggesting that learners struggle to navigate and use digital tools effectively. Also, technical support from the school is perceived as largely unavailable when pupils encounter difficulties with blended-learning resources, as evidenced by the lowest mean of 2.0 and SD of 0.91, indicating that assistance structures are underdeveloped and pupils often have to manage technical issues independently. While digital resources are seen as somewhat user-friendly, the combined effects of limited access, inadequate practice time, financial barriers, low digital literacy, and insufficient technical support significantly constrain the effective implementation of blended numeracy learning from the pupils' perspective.

Table 4: Responses to Research Question 3: What challenges do teachers and school management face in implementing blended learning for numeracy skills development of primary school pupils in Lagos State?

No.	Statement	VT (4)	T (3)	UT (2)	VUT (1)	Total	Mean	SD
1	Lack of sufficient technical support staff in the school hinders effective blended learning implementation.	60 (33.3%)	57 (31.7%)	42 (23.3%)	21 (11.7%)	180	2.7	0.95
2	The high cost of instructional resources and digital tools is a significant barrier to management.	72 (40.0%)	54 (30.0%)	36 (20.0%)	18 (10.0%)	180	2.8	0.86
3	Integrating technology into the existing curriculum is difficult due to time constraints in the school timetable.	54 (30.0%)	63 (35.0%)	45 (25.0%)	18 (10.0%)	180	2.8	0.88
4	Power supply/electricity failures frequently disrupt the implementation of digital numeracy lessons.	66 (36.7%)	60 (33.3%)	36 (20.0%)	18 (10.0%)	180	2.8	0.85
5	Teachers' attitudes or resistance to adopting new technology-based teaching methods is a challenge to management.	42 (23.3%)	54 (30.0%)	51 (28.3%)	33 (18.3%)	180	2.6	0.98
6	Inconsistency in monitoring and evaluation of blended learning effectiveness is a	48 (26.7%)	57 (31.7%)	48 (26.7%)	27 (15.0%)	180	2.7	0.94

No.	Statement	VT (4)	T (3)	UT (2)	VUT (1)	Total	Mean	SD
	problem faced by management.							
7	Lack of adequate professional training on blended learning is a major challenge.	60 (33.3%)	60 (33.3%)	39 (21.7%)	21 (11.7%)	180	2.7	0.92
8	The available class sizes are too large to effectively manage both face-to-face and online components of blended learning.	51 (28.3%)	60 (33.3%)	45 (25.0%)	24 (13.3%)	180	2.7	0.90
9	The current management strategies are effective in ensuring the integration of blended learning in numeracy education.	18 (10.0%)	36 (20.0%)	72 (40.0%)	54 (30.0%)	180	2.2	0.94

Table 4 reveals that majority of the Respondents largely agree that blended learning faces systemic hurdles such as unreliable power, costs, training, and staffing common in resource-constrained settings like Nigerian schools. Management struggles most with evaluation and strategy. Power disruptions and costs emerge as top priorities for intervention. This point to policy needs for infrastructure investment and teacher capacity-building to boost digital numeracy.

Analysis of the null Hypotheses.

Table 5: There is no significant relationship between availability of blended learning tools in teaching and learning and pupils' numeracy skills in primary schools

		Availability of blended e-learning approach	Pupils' Numeracy skills
Availability of blended e-learning approach	Pearson Correlation	1	0.68
	Sig. (2-tailed)		.001
	N	180	180
Pupils' Numeracy skills	Pearson Correlation	0.68	1
	Sig. (2-tailed)	.001	
	N	180	180

A Pearson Product-Moment Correlation was conducted to determine the relationship between the availability of blended learning approach and pupils' numeracy skills in primary schools in Lagos State. The result showed a correlation coefficient of $r = 0.68$, $p = 0.001$, indicating a strong positive and statistically significant relationship between the two variables at the 0.05 level. Since $p < 0.05$, the result is significant; therefore, the null hypothesis stating that there is no significant relationship between availability of blended learning approach in teaching and learning and pupils' numeracy skills in primary schools is rejected. This implies that as the availability of blended e-learning approach increases, pupils' numeracy skills also tend to improve.

Table 6: There is no significant relationship between accessibility of blended e-learning tools in teaching and learning and pupils' numeracy skills in primary school

		Accessibility of blended e-learning tools	Pupils' numeracy skills
Accessibility of blended e-learning tool	Pearson Correlation	1	.61
	Sig. (2-tailed)		.003
	N	180	180
Pupils' numeracy skills	Pearson Correlation	.61	1
	Sig. (2-tailed)	.003	
	N	180	180

A Pearson Product-Moment Correlation was conducted to examine the relationship between the accessibility of blended e-learning tools and numeracy skills of primary school pupils. The result revealed a correlation coefficient of $r = 0.61$, $p = 0.003$, indicating a moderate to strong positive and statistically significant relationship. Since $p < 0.05$, the null hypothesis stating that there is no significant relationship between accessibility of blended e-learning tools in teaching and learning and pupils' numeracy skills in primary school is **rejected**. This suggests that when pupils have easier access to blended e-learning resources (devices, data, platforms), their numeracy skills tend to increase.

Table 7: There is no significant relationship between accessibility of blended learning approach in teaching and learning and pupils' numeracy skills in primary school

		Teachers' challenges	Pupils' numeracy skills
Teachers' challenges	Pearson Correlation	1	-0.58
	Sig. (2-tailed)		.004
	N	180	180
Pupils' numeracy skills	Pearson Correlation	-0.58	1
	Sig. (2-tailed)	.004	
	N	180	180

A Pearson Product-Moment Correlation was conducted to determine the relationship between the level of challenges faced by teachers on blended learning approach and the development of pupils' numeracy skills. The result showed a correlation coefficient of $r = –0.58$, $p = 0.004$, indicating a moderate negative and statistically significant relationship. Since $p < 0.05$, the null hypothesis is rejected. This implies that higher levels of infrastructure, financial, and human-resource challenges (e.g., lack of training, power failure, class size, poor support) are associated with lower pupils' numeracy skills, while fewer challenges support better blended-learning outcomes.

Table 8: There is no significant relationship between challenges that school management face in the implementation of blended learning approach and development of pupils' numeracy skills in primary school

		Pupils' Numeracy Skills	School Management Challenges
School Management Challenges	Pearson Correlation	1	-0.60
	Sig. (2-tailed)		.003
	N	180	180
Pupils' Numeracy Skills	Pearson Correlation	-0.60	1
	Sig. (2-tailed)	.003	
	N	180	180

Table 8 shows a Pearson Product Moment Correlation was conducted to determine the relationship between school management related challenges and pupils' numeracy skills. The result showed a correlation coefficient of $r = –0.60$, $p = 0.003$, indicating a moderate negative and statistically significant relationship at the 0.05 level of significance. Since $p < 0.05$, the null hypothesis is rejected. This implies that school management related challenges such as inadequate funding, poor provision of ICT facilities, unreliable power supply, weak policy implementation, and lack of technical support significantly affect pupils' numeracy skills negatively. In other words, higher levels of school management related challenges are associated with lower numeracy skills/performance, while improved institutional support enhances the effectiveness of blended learning.

Discussion of Findings

The finding revealed a strong positive relationship between the availability of blended learning tools approach and pupils' numeracy skills. This implies that increased in the usage of blended learning approach enhances pupils' engagement and numeracy skills. The findings of this study aligned with and extend recent evidence on blended learning and digital-numeracy implementation in Nigerian and other African primary school contexts which aimed to promote pupils' numeracy skill. At the primary school level, the data show that teachers perceive limited availability of computers and mobile devices, unreliable internet connectivity, and weak government support for digital resources, all of which correspond with findings from studies on ICT in education in Lagos and other parts of Nigeria. It is expected that the availability of this facilities alongside with traditional method of teaching if put together to form blended leaning approach will bring about pupil's numeracy skills in primary school. The finding is in line with Ojaleye and Awofala (2018) on blended learning and problem-based learning instructional strategies as determinants of students' achievement in algebra. Similarly, Omotayo (2016) in a study on effect of blended learning strategies on students learning outcomes in algeria emphasizing that inadequate devices, poor connectivity, and inconsistent policy backing as major constraints to effective technology integrated teaching and performance of students. In relation to the hypotheses and correlation results, the positive and statistically significant associations between availability and accessibility of blended learning tools and numeracy performance resonate with the comparative studies of Iyawa and Binitie (2025) who stated that learning outcomes is improved when students have regular, structured access to digital resources which is an aspect of blended learning approach. It is also important to point out that, pupils in schools with well-resourced may simply exhibit a comparative advantage of higher numeracy skills or due to broader socio-economic advantages rather than just relying on blended learning tools alone. Also, the finding is in line with Kintu, et al. (2017) that there is a significant relationship between blended learning approach and pupils' numeracy skill than conventional teaching approach alone.

The study found a significant positive relationship between accessibility of blended approach and pupils' numeracy skills, indicating that pupils must not only have tools available but must also be able to use them regularly. At the pupil level, the results indicate that many pupils struggle to log in to online platforms, lacks sufficient in school practice time with digital tools, and have limited access to devices and data at home, while digital literacy and technical support are generally low. These findings closely mirror recent work on digital literacy programmes and blended learning interventions in Olanrewaju (2021), which reports that poor access to devices, unaffordable of internet data, and low digital literacy are key barriers to effective e-learning on pupil's numeracy skills in rural Nigerian schools, and that learners often receive little or no technical support when encountering platform access problems. The negative correlation between cost related barriers and pupils' numeracy skill, and the low mean on

technical support further confirm that pupils are often isolated when facing technical difficulties, a pattern also observed in studies on primary school digital learning pilots in low- and middle-income settings owing to the peculiarity of the environment of the school. Similarly, assessing the impact of ICT integration on learning outcomes in Nigerian schools by Iyawa and Binitie (2025) reports a positive link between ICT accessibility on learning outcomes and numeracy skill, while also showing that unstable power supply, insufficient ICT infrastructure, and limited teacher training reduce the magnitude of these gains, reinforcing the view that infrastructural and human resource constraints may directly undermine instructional quality due to the state of the school in terms required teaching aids on numeracy skills of the pupils. More so, Gbesoevi et al. (2025) added that quality teaching must be delivered by teachers to student to make teaching effective and must be prioritize in schools.

The finding showed a significant negative relationship between the combined challenges faced by teachers' and pupils' numeracy skills. This suggests that increased challenges reduce the effectiveness of blended learning implementation. From the teacher readiness perspective, the study shows that power failures, high costs of digital tools, large class sizes, and inadequate training significantly correlates the integration of blended learning approach to numeracy skills. Respondents also report inconsistent monitoring and evaluation and, to some extent, teacher resistance to new technology-based methods. These observations corroborate with Mbaying et al. (2025) in a study on digital technology integration into educational instruction in Nigeria, which emphasizes that infrastructural inadequacies, unreliable power, weak internet connectivity, and low teacher digital literacy which is less than 60% lacks basic skills which undermine the effective use of educational technologies in Nigerian schools. At the same time, the relatively high mean on the item concerning blended learning improving pupil engagement is consistent with Sanwal (2019) showing that blended learning approach can significantly correlates and enhance pupils' numeracy skills when properly supported.

The finding also revealed a significant negative relationship between school management related challenges and pupils' numeracy skills. This indicates that issues such as inadequate funding, poor ICT provision, unreliable power supply, weak policy implementation, and lack of technical support significantly and negatively correlates pupils' numeracy skills. This finding is in agreement with Omotayo (2016), who identified inadequate infrastructure, poor connectivity, and weak institutional support as major constraints to technology integrated learning that can promote pupils numeracy skills. It also corroborates Iyawa and Binitie (2025), who reported that although ICT integration improves learning outcomes, its effectiveness is significantly reduced by poor infrastructure, unstable power supply, and insufficient institutional support. These studies highlight that school management plays a critical role in creating an enabling environment for blended learning approach to succeed in school and more importantly developing pupils' numeracy skills

Conversely, the negative correlation between the level of management and teacher level challenges and numeracy performance supports the view that infrastructural, financial, and human resources constraints are not merely logistical inconveniences but directly reduce instructional quality and learning gains in blended learning environments. Wijaya et al. (2020) examined barriers to the optimal implementation of digital learning technologies in Indonesian primary schools, with specific focus on accessibility constraints limiting teachers' and pupils' engagement with blended numeracy learning approach. Together, these patterns indicate that the effectiveness of blended learning approach on pupils' numeracy skills in primary schools depends not only on the presence of digital tools but also on coordinated investment in infrastructure, teacher capacity, technical support, and equitable access. The discussion of findings shows that the observed patterns moderate enthusiasm for blended learning, constrained infrastructure, limited home access, low digital literacy, and weak management support are

consistent with recent empirical work on digital learning implementation in Nigerian and other African schools. The study therefore reinforces the broader conclusion that blended learning holds a promising advantage for pupils' numeracy skills in primary schools in Lagos State

Conclusion

The findings imply that school administrators must prioritize investment in ICT infrastructure, reliable power supply, and technical support personnel to create an enabling environment for blended learning approach on pupils' numeracy skills. Teachers need structured professional development and regular retraining on blended learning methodologies, digital pedagogy, and classroom management of large classes using mixed modalities. Ongoing support for improving digital literacy among pupils is also essential. Education policymakers in Lagos State should integrate blended learning principles into the primary numeracy curriculum and provide clear guidelines, funding, and monitoring mechanisms to ensure equitable access for both pupils and teachers.

The study therefore concludes that blended learning has the potential to enhance pupil engagement and numeracy skills in Lagos State primary schools, but this potential is currently constrained by weak digital infrastructure, limited access to devices and data, low digital literacy, and inadequate technical and managerial support. Gbesoevi et al. (2023), submits that several key factors contribute to the enhancement of quality teaching among them is blended teaching. The availability, accessibility, and quality of blended e-learning resources are significant to achieving pupils' numeracy skills, while the challenges faced by teachers and school management on blended learning approach negatively influence the numeracy skills of the pupils.

Recommendations

The following recommendations were provided:

- Government should provide schools with adequate computers, tablets, projectors, and reliable Internet connectivity, and establish a minimum ICT standard for all primary schools teaching numeracy.
- Implement schemes such as shared devices, school-based hotspot, and data-subsidy partnerships to ensure that both public and private school pupils have equitable access to online numeracy platforms.
- Launch regular capacity-building programmes on blended numeracy teaching, covering content creation, use of e-assessment tools, and management of mixed-mode instruction in large classes.
- Technical support staff should be designated to schools across the districts and develop simple troubleshooting guides for teachers and pupils to minimize disruption during digital lessons.
- The school management should reorganize the school timetable to allocate dedicated periods for digital numeracy practice and encourage lesson planning that explicitly integrates online and offline activities.
- Introduce school-based monitoring systems that track the use of blended tools, pupils' engagement, and numeracy outcomes, using the data to refine teaching strategies and resource allocation.

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