



The Role of ICT in Enhancing Student Participation in Physical and Health Education in Public Secondary Schools in Plateau State, Nigeria.

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ABSTRACT



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The integration of Information and Communication Technology (ICT) into Physical and Health Education (PHE) has the potential to revolutionise teaching and learning by enhancing student participation, engagement and performance. This study investigated the role of ICT in enhancing student participation in PHE in public secondary schools in Plateau State, Nigeria. We collected data from 340 students and 104 staff members across 32 secondary schools using a stratified sampling technique, employing a descriptive research design. A structured questionnaire titled Information Communication Technology and Physical and Health Education (ICTAPHE) was used for data collection, with a Cronbach's Alpha reliability coefficient of 0.82. Findings revealed that ICT tools, such as fitness apps, online platforms, and interactive multimedia, positively influenced student interest, understanding and collaboration in PHE. However, limited access to ICT facilities, inadequate teacher training, and inconsistent power supply posed significant challenges. The study recommends targeted interventions to improve ICT infrastructure, professional development for teachers, and policy support to ensure successful integration of ICT in PHE. These findings underscore the transformative role of ICT in PHE and its potential to foster a more engaging and effective learning environment.

INTRODUCTION

Physical and Health Education (PHE) is vital for fostering students' physical, mental, and social well-being. However, traditional teaching methods in public secondary schools in Plateau State, Nigeria, often fail to fully engage students in PHE classes. The integration of Information and Communication Technology (ICT) offers a transformative solution, enhancing participation and improving educational outcomes in PHE.

ICT tools, such as interactive whiteboards, fitness apps, and educational software, make PHE lessons more interactive and engaging. According to UNESCO (n.d.), ICT diversifies teaching methods, catering to different learning styles and promoting active learning over rote memorization. Animations, videos, and interactive quizzes have proven effective in improving student engagement and understanding (Akinbobola, 2020).

Personalised learning is another benefit of ICT in PHE. Tools like fitness trackers and wearable devices monitor physical activity and provide tailored feedback, empowering students to take ownership of their learning (Agbulu et al., 2018). Additionally, ICT fosters collaboration through online platforms, where students share resources and engage in group discussions, improving teamwork and communication skills (Ocholi, 2019; Yusuf & Balogun, 2021).

Research confirms the effectiveness of ICT in enhancing student participation in PHE. Agbulu et al. (2018) reported significant improvements in engagement, physical fitness, and academic performance. Similarly, Ocholi (2019) and Yusuf and Balogun (2021) highlighted increased motivation, enjoyment, and active participation when ICT tools were incorporated into PHE classes.

LITERATURE REVIEW

Sink, Nelson, and Moynes (2016) describe physical education as a structured program aimed at developing fitness, skills, and attitudes through physical activities. Similarly, Nutbeam (2014) defines health education as the process of equipping individuals with knowledge and skills to improve health behaviours and well-being. Wilson and Zwolinsky (2021) emphasise the multidimensional nature of PHE, integrating physical activity, healthy lifestyles, and mental health practices. ICT, according to Dillavou and Yildiz (2017), involves tools for collecting, storing, and transmitting information, while Ojokheta and Eke (2019) add that ICT enables the creation, manipulation, and sharing of digital content.

Role of ICT in Motivating Students

ICT enhances student motivation by making learning engaging and personalized. The International Telecommunication Union (2019) states that incorporating ICT stimulates participation by making lessons more relevant. Sánchez and Guns (2018)

argue that adaptive ICT tools help address individual needs, while Lister et al. (2009) highlight how immediate feedback and collaborative opportunities foster motivation and active learning.

Use of ICT for Skill Development

ICT supports skill development through interactive tools and resources. Gokhale and Bhushan (2019) note that platforms like virtual simulations and multimedia content facilitate personalised learning, while Furuoka and Bahari (2018) emphasise ICT's role in promoting lifelong learning and employability in a digital world.

ICT Tools in PHE Classes

ICT enhances teaching and learning in PHE by creating interactive environments. Sandford, Ulicsak, Facer, and Rudd (2006) suggest that tools like fitness apps and virtual reality promote self-directed learning and engagement. ICT resources, such as educational videos and games, expand students' understanding of PHE concepts, increasing motivation and participation.

Challenges in Implementing ICT in PHE

Integrating ICT in PHE faces challenges such as limited access to technology and insufficient teacher training. Ní Chuilleanáin and Spielhofer (2010) note that inadequate infrastructure limits ICT use, while Heikkinen, Väisänen, and Kärkkäinen (2020) highlight teachers' lack of digital skills as a barrier. Resistance to change, as Hagger, Chatzisarantis, and Culverhouse (2003) suggest, further hinders effective adoption.

Strategies for Successful Integration

Effective ICT integration requires teacher training, interactive activities, and collaborative platforms. Sharma and Kupriyanova (2017) advocate for professional development programs to build teachers' ICT skills. Hardy, Jonson, and Kerr (2017) recommend gamification to boost engagement, while Oosterhof, Conrad, and Ely (2008) highlight the benefits of online platforms for enhancing communication and learning outcomes.

Statement of the Problem

The declining level of student participation in Physical and Health Education (PHE) in public secondary schools in Plateau State, Nigeria, is a growing concern. Despite the recognised importance of PHE in promoting students' physical, mental, and social well-being, traditional teaching methods often fail to adequately engage students or foster enthusiasm for learning. Research suggests that Information and Communication Technology (ICT) can transform PHE teaching by introducing interactive, engaging, and personalised learning experiences. However, in Plateau State, the extent of ICT adoption

in PHE is limited due to challenges such as inadequate infrastructure, insufficient teacher training, and resistance to change. These limitations hinder the full potential of ICT in enhancing student participation and achieving educational goals. This study seeks to bridge the gap by exploring the role of ICT in fostering active student participation in PHE, assessing its impacts, and identifying barriers to effective implementation in public secondary schools.

Research Objectives

Explicitly, the study aimed to achieve the following objectives:

1. To examine the extent to which Information and Communication Technology (ICT) is utilised in the delivery of Physical and Health Education (PHE) in public secondary schools in the Central Zone of Plateau State.
2. To assess the impact of ICT tools (such as computers, tablets, and online resources) on student participation and engagement in Physical and Health Education classes in the Central Zone of Plateau State public secondary schools.
3. To identify the challenges faced by teachers and students in integrating ICT into Physical and Health Education programs in public secondary schools in the Central Zone of Plateau State.

Research Questions

The study aimed to answer the following research questions:

1. To what extent is Information and Communication Technology (ICT) currently being utilised in the delivery of Physical and Health Education in public secondary schools in the Central Zone of Plateau State?
2. What is the impact of ICT tools on student participation and engagement in physical and

health education classes in public secondary schools in the Central Zone of Plateau State?

3. What challenges do Physical and Health Education teachers and students face in integrating ICT into the curriculum and instructional processes in the Central Zone of Plateau State public secondary schools?

METHODOLOGY

This study employed a descriptive research design to assess the impact of Information and Communication Technology (ICT) on student participation in Physical and Health Education (PHE). The population comprised all physical and health education teachers, school administrators, ICT coordinators, and secondary school students across 159 public secondary schools within Central Plateau State, Nigeria. To ensure proportional representation, a 20% sampling proportion was applied, resulting in a sample size of 32 schools distributed across the five Local Government Areas (LGAs) in the zone. Specifically, Bokkos (32 schools) contributed approximately 6 schools; Kanke (18 schools) contributed 4 schools; Kanam (22 schools) contributed 4 schools; Mangu, with the highest number of schools (55), contributed 11 schools; and Pankshin (32 schools) contributed 6 schools. This proportional stratified sampling method ensured fair representation from each LGA while maintaining a manageable sample size. The total sample consisted of 340 students and 104 staff members, distributed across the LGAs as follows: Students: 70 from Bokkos, 45 from Kanke, 50 from Kanam, 115 from Mangu, and 60 from Pankshin. Staff: This group included 42 physical and health education teachers and 31 school administrators and ICT coordinators.

RESULTS

Student Demographic (Field Survey, 2024)

GENDER DISTRIBUTION OF STUDENTS

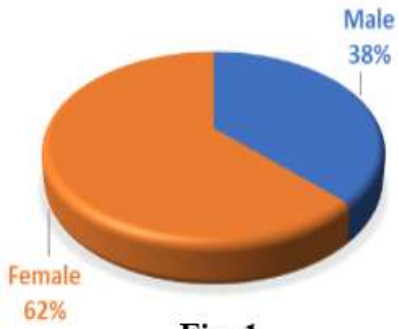


Fig. 1

AGE DISTRIBUTION OF THE STUDENTS

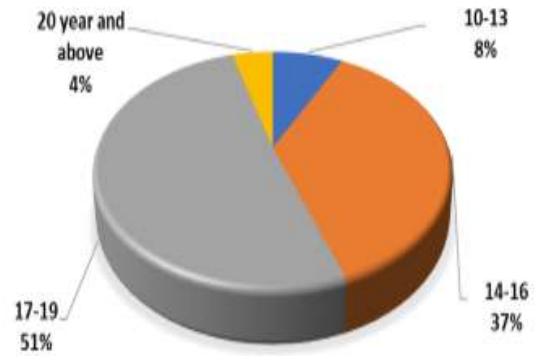


Fig. 2

CLASS LEVEL DISTRIBUTION

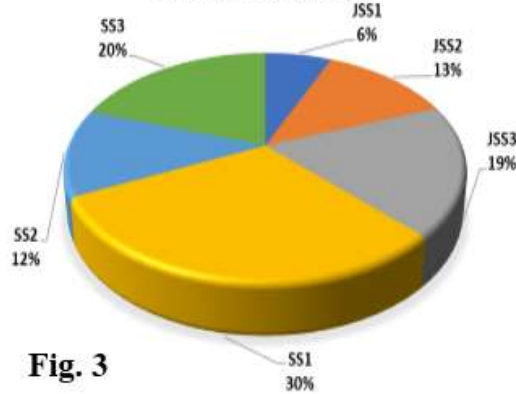


Fig. 3

Staff Demographic figure 4-6 (Field Survey, 2024)

GENDER DISTRIBUTION OF THE STAFF



Fig. 4

DISTRIBUTION OF STAFF POSITION IN SCHOOL

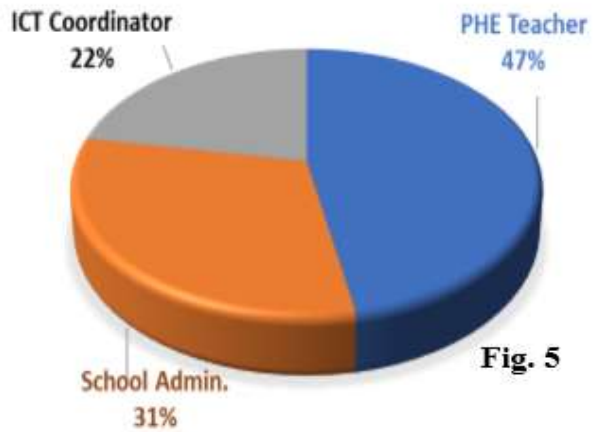


Fig. 5

DURATION OF WORK EXPERIENCE

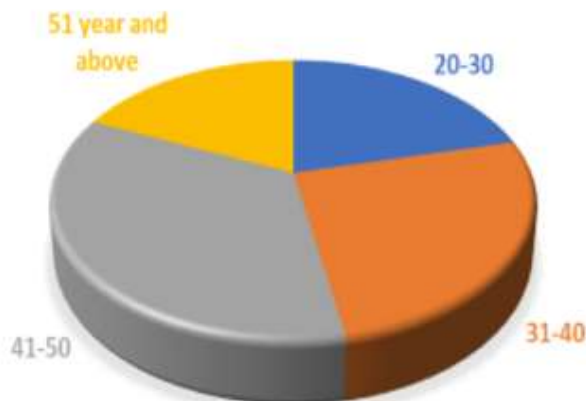


Fig. 6

Student Demographics (Field Survey, 2024)

The survey revealed a gender distribution among students in figure 1, with 62% identifying as female and 38% as male. This indicates a predominance of female students within the Physical and Health Education (PHE) programs, which may reflect broader enrolment trends observed in public secondary schools in the Central Zone of Plateau State.

The age distribution of respondents in figure 2 showed that the majority (51%) were aged 17-19 years, followed by 37% in the 14-16 age range. Students aged 10-13 constituted 8%, while only 4% were aged 20 years and above. This suggests that most participants are in their senior secondary school years, correlating with increased engagement in physical and health education.

The largest group of students shown in figure 3 was in Senior Secondary One (SS1), representing 30% of respondents. This was followed by equal representations of Senior Secondary Three (SS3) and Junior Secondary Three (JSS3) at 19% each. Participation was lower in Junior Secondary Two (JSS2) at 13%, Senior Secondary Two (SS2) at 12%, and Junior Secondary One (JSS1) at 6%. This distribution indicates varying levels of participation in PHE across different class levels, with SS1 students appearing to be the most actively involved.

Staff Demographics (Field Survey, 2024)

The gender distribution among staff in figure 4 indicated that 56% were male and 44% female, suggesting a slightly higher representation of male staff in physical and health education programs. This gender composition may influence the integration of Information and Communication Technology (ICT) in teaching, given potential differences in technological exposure and comfort.

Among staff respondents shown pictorially in figure 5, 47% were physical and health education teachers, 31% were school administrators, and 22% were ICT coordinators. This diverse composition captures perspectives from key stakeholders involved in ICT implementation in education, ensuring a range of insights into its challenges and impacts.

The majority of staff members (41%) had 31-40 years of experience, followed by 35% with 20-30 years. Only 16% had 41-50 years of experience, and 8% had over 51 years, as shown in figure 6. This suggests that most surveyed staff members are highly experienced, potentially influencing their adaptability and willingness to integrate ICT into physical and health education.

Research Question 1

To what extent is ICT currently being utilized in the delivery of Physical and Health Education in public secondary schools in Central Zone of Plateau State?

Table 1: Students' Responses on ICT Utilization in PHE Classes.

S/N	ITEMS	N	Mean	Standard Deviation
1	ICT tools used during PHE classes in my school.	340	1.86	0.86
2	My PHE lessons involve the use of online platforms or digital resources	340	1.97	0.93
3	Teachers in my school often use ICT tools to explain difficult concepts in PHE.	340	2.16	1.15
4	I am encouraged to use ICT tools to complete assignments or projects in PHE.	340	2.92	1.36

Field Survey, 2024

Table 1 illustrates the limited integration of ICT in physical and health education lessons. The first item (SD = 0.86) indicates that tools such as projectors and tablets are seldom used, reflecting a consistent lack of ICT integration across schools. Similarly, Item 2 (SD = 0.93) shows minimal use of online resources like videos and simulations, confirming that students are largely missing out on these educational aids. Item 3 (SD = 1.15) demonstrates slightly more variability in teachers' occasional use of ICT to clarify challenging concepts, although overall usage remains low. The greatest variability was noted in Item 4 (SD = 1.36),

indicating inconsistent encouragement for students to utilise ICT tools for projects. Overall, the low levels of ICT utilisation in PHE highlight a need for a stronger emphasis on integrating technology in instruction.

Research Question 2

What is the impact of ICT tools on student participation and engagement in Physical and Health Education classes in public secondary schools in Central Zone of Plateau State?

Table 2: Impact of ICT on Student Engagement in PHE.

S/N	ITEMS	N	Mean	Standard Deviation
5.	ICT tools make PHE lessons more interesting and engaging for me.	340	3.22	0.91
6.	The use of ICT tools in class helps me better understand the topics covered in PHE.	340	3.40	0.75
7.	I am more likely to participate actively in PHE activities when ICT tools are used.	340	3.21	0.81
8.	ICT tools encourage collaboration and interaction among students during PHE lessons.	340	3.42	0.75

Field Survey, 2024

Table 2 reveals a positive influence of ICT on student engagement in PHE. Item 5 (SD = 0.91) shows that students find ICT engaging, with a shared perception among respondents. Item 6 (SD = 0.75) suggests that ICT significantly enhances comprehension, reflecting strong student agreement on its instructional value. Item 7 (SD = 0.81) demonstrates that ICT promotes active participation, although this experience is not uniform across all students. Finally, Item 8 (SD = 0.75) indicates that ICT fosters collaboration, which aligns with PHE's

emphasis on teamwork. Collectively, these findings suggest that ICT positively affects student interest, understanding, and collaboration in PHE.

Research Question 3

What challenges do Physical and Health Education teachers and students face in integrating ICT into the curriculum and instructional processes in Central Zone of Plateau State public secondary schools?

Table 3: Challenges in Integrating ICT into PHE by students.

S/N	ITEMS	N	Mean	Standard Deviation
9.	My school lacks adequate ICT facilities for use in PHE.	340	2.76	1.11
10.	Power supply issues in my school make it difficult to use ICT tools during PHE classes.	340	3.09	0.97
11.	I do not have enough training or experience to use ICT tools effectively for learning PHE.	340	2.29	1.10
12.	Teachers in my school face difficulties in using ICT tools during PHE lessons due to technical problems or lack of knowledge.	340	2.91	1.01

Field Survey, 2024

Table 3 identifies several challenges faced in the integration of ICT within PHE instruction. Item 9 (SD = 1.11) highlights inadequate facilities, indicating some schools are better equipped than others. Item 10 (SD = 0.97) points to power supply issues as a widespread barrier to effective ICT integration.

Additionally, Item 11 (SD = 1.10) reveals variability in students' self-reported ICT training, suggesting many lack the necessary skills for effective use. Item 12 (SD = 1.01) indicates that teachers face technical challenges and knowledge gaps, which points to a disparity in ICT proficiency among educators.

Table 4: Teacher's Responses on ICT Utilization in PHE

S/N	ITEMS	N	Mean	Standard Deviation
1	ICT tools such as projectors, computers, or tablets are regularly integrated into the delivery of PHE lessons in my school.	104	2.35	1.04
2	Online resources are often used to teach concepts in PHE.	104	2.12	1.07
3	I frequently use ICT tools to prepare or deliver PHE lessons.	104	2.37	1.10
4	My school encourages and supports the use of ICT in the teaching of PHE.	104	3.13	0.74

Field Survey, 2024

The analysis of staff responses, as shown in Table 4, indicates limited integration of ICT tools in PHE lessons. Teachers reported that they rarely use tools such as projectors, computers, or tablets (SD = 1.04), with variability in usage patterns across schools.

Similarly, online resources such as videos and simulations are underutilised (SD = 1.07), suggesting that teachers are not fully leveraging available digital content. Furthermore, educational software and apps are infrequently employed for lesson preparation or

delivery (SD = 1.10), indicating minimal adoption of these technologies. While some schools offer

occasional support for ICT use in PHE (SD = 0.74), this has not resulted in widespread integration.

Table 5: Impact of ICT on Students Engagement in PHE.

S/N	ITEMS	N	Mean	Standard Deviation
5.	The use of ICT tools during lessons improves student interest and engagement in PHE.	104	2.90	1.02
6.	Students participate more actively in class activities when ICT tools are incorporated into PHE lessons.	104	2.63	1.11
7.	ICT tools help students better understand difficult concepts in PHE.	104	2.99	1.06
8.	I have observed that ICT tools enhance collaboration and interaction among students in PHE classes.	104	2.59	1.02

Field Survey, 2024

According to Table 5, staff responses suggest that ICT tools can enhance student engagement and understanding in PHE, although their application remains inconsistent. Teachers indicated that ICT somewhat improves student interest (SD = 1.02), yet the positive impact is moderate. Furthermore, while

student participation tends to increase with ICT use (SD = 1.11), the low mean score highlights variability in engagement. Educators also recognise ICT's potential to assist students in grasping challenging concepts (SD = 1.06), but the sporadic application limits its effectiveness.

Table 6: Challenges in Integrating ICT into PHE by Teachers.

S/N	ITEMS	N	Mean	Standard Deviation
9.	My school lacks sufficient ICT facilities to support the teaching of PHE.	104	3.00	0.90
10.	Power supply issues often hinder the effective use of ICT tools during PHE classes.	104	3.24	0.79
11.	Teachers face challenges in using ICT tools due to a lack of technical skills or training.	104	3.33	1.11
12.	Technical difficulties frequently disrupt the use of ICT tools in PHE lessons.	104	3.04	0.88

According to the analysis in table 6, the key obstacles to effective ICT integration identified by teachers include inadequate ICT facilities (SD = 0.90), which align with student feedback. Power supply issues (SD = 0.79) and a lack of technical skills among teachers (SD = 1.11) are significant barriers, indicating a disparity in readiness among staff. Additionally, technical difficulties such as software glitches and equipment malfunctions (SD = 0.88) frequently hinder the effective use of ICT in classrooms.

DISCUSSION OF FINDINGS

Findings reveal a gap between the potential of ICT in Physical and Health Education (PHE) and its current, limited implementation. Students acknowledge ICT's positive impact, yet low usage indicates significant barriers. Inadequate infrastructure and insufficient training, as supported by studies like Smith et al. (2023) and Johnson & Lee (2022), are key obstacles. These studies showed that limited resources and undertrained staff hinder effective integration, missing opportunities for enhanced learning. Furthermore, inconsistent ICT application across schools, ranging from VR to basic videos, creates inequity as

highlighted by Johnson and Lee (2022) and Brown & Green (2021). A standardised framework is needed to ensure equitable benefits. Addressing these issues requires improving infrastructure and providing comprehensive teacher training to boost confidence in ICT use. This would not only benefit PHE but also contribute to students' broader digital literacy, as noted by Brown & Green (2021).

CONCLUSION

In conclusion, this study reveals that the integration of ICT in physical and health education lessons is currently limited, with both students and teachers acknowledging its potential benefits. However, several challenges—including inadequate facilities, power supply issues, and a lack of training—hinder effective ICT use. To improve student engagement and understanding in PHE, it is essential to invest in ICT resources and training for both students and teachers. This will not only enhance the educational experience but also prepare students for a more technology-integrated future. Future research should focus on strategies for overcoming these barriers to facilitate better ICT integration in PHE.

RECOMMENDATIONS

Based on the findings of this study, the following recommendations are made to enhance the use of ICT in Physical and Health Education (PHE):

1. The government and school authorities should prioritise the provision of ICT facilities, such as computers, projectors, interactive whiteboards, and reliable internet connections in public secondary schools.
2. Regular professional development programs should be organised to equip PHE teachers with the skills required to integrate ICT tools effectively into their teaching.
3. ICT should be embedded into the PHE curriculum, with specific guidelines on how teachers can use technology to deliver lessons, engage students, and assess learning outcomes.
4. Schools should create online platforms where teachers and students can share resources, collaborate, and exchange ideas to enhance PHE lessons.
5. The Ministry of Education should formulate policies to ensure the mandatory integration of ICT into PHE across all public secondary schools.
6. Sensitisation programs should be conducted for teachers, students, and parents to emphasise the benefits of ICT in enhancing participation in PHE.
7. Schools should establish monitoring and evaluation mechanisms to assess the effectiveness of ICT integration in PHE and identify areas for improvement.

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