



FROM CHALKBOARD TO INTERACTIVE WHITEBOARD: EVALUATING THE IMPACT OF TECHNOLOGY ON TEACHING METHODS AMONG PRIVATE SECONDARY SCHOOLS IN CALABAR MUNICIPALITY, CROSS RIVER STATE

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ABSTRACT

This study examined the use of technology and teachers' teaching methods in private secondary schools in Calabar municipality, Cross River State, Nigeria, with a focus on the interactive whiteboard. To accomplish this purpose, two hypotheses were formulated to direct the study. The study employed purposive sampling to select seven private secondary schools, 115 teachers, and 115 students. The study employed two research instruments to collect data: the Technology and Teaching Questionnaire (TTQ) and the Technology and Learning Outcome Questionnaire (TLOQ), which were administered to teachers and students, respectively. Statistical analyses were conducted using an independent t-test and simple linear regression. 05 level of significance. The findings reveal a difference in the level of teaching effectiveness between private secondary school teachers who utilise technology and those who do not in Calabar Municipality, and that the integration of technology is highly significant to students' academic achievement among private secondary schools in Calabar Municipality. Recommendations: The study's findings, as recommendations, call on School administrators to take the issue of technology integration seriously through regular training of teachers and providing them with digital tools to increase teaching effectiveness. Additionally, policymakers are encouraged to develop policies that support technology-enhanced learning objectives, which may contribute to enhancing student academic achievement. It is also suggested that educational shareholders should provide technological infrastructure and professional development programs that enable and enhance teachers' ability to use technology effectively in their teaching practices.

Keywords: Chalkboard, Interactive Whiteboard, Technology, Teaching Methods, Private Secondary Schools

Introduction

Teaching with technology is a significant component now of modern education, as teachers and students use laptops, tablets, and even smartphones to reach students and

access information in ways we never dreamed possible. The role of technology in education is far more than just making things easier for educators; it makes learning more exciting for students, it engages them better, and it diversifies the types of knowledge gained from schooling. According to Searcy and Welch (2008), “technology integration can result in better student outcomes, such as higher academic achievement, greater student motivation, and better preparation for future careers” (Hew & Wu, 2020).

Technology should be effectively integrated in the classroom, so that teachers can design personalised learning experiences that meet the learning preferences and the varying needs of learners. Multimedia learning resources, learning management systems and instructional software are digital tools providing immersive, interactive learning experience that tend to improve understanding and retention. Moreover, it also enables people to work together, communicate, and think critically—all essential skills for the twenty-first century. Tech-enabled learning can improve engagement with students, promote active learning and help develop key skills such as problem solving and cooperation," according to a recent study (Bao, 2022).

With the correct use of technology, teachers can build more effective, accessible, flexible learning environments that help students to succeed in an ever-shifting, highly connected world.” Technology enables teachers to track students’ achievement and discover their learning deficits, but it also enables teachers to personalise instruction to reach a wide range of learners. In addition, technology-mediated instruction increases educational access, contributes to equity, and provides all learners with equal opportunities to succeed.

Education tools are increasingly becoming digitised as a result of developments in information technology and its broader application in education. Conventional tools, such as chalkboards or non-interactive whiteboards, are becoming outdated; they no longer meet the requirements of modern interactive teaching styles. In this sense, IWBs arise as a more sophisticated and adequate successor. Teachers were among the first to recognise how interactive whiteboards can help create a more collaborative and learning-focused environment, as well as make it easier to plan and deliver lessons (SMART Technologies, 2006). Teachers remain the most active user community of this system (Ran, Greenwood, Fox-Turnbull, & Wise, 2018).

Notwithstanding the widespread implementation and use of IWBs, many fundamental questions have been raised about their 'real' influence in education. Perhaps inevitably, researchers and practitioners have been particularly interested in ascertaining the impact that IWBs have on teaching and learning, the obstacles to IWB use, and the progress that has been made to date. Seeking answers to these questions is crucial for a comprehensive understanding of the impact of IWBs in contemporary education.

Studies have shown that the interactive features of IWBs can attract students’ attention, increase their concentration, and achieve better teaching and learning results (Tsayang, Batane & Majuta, 2020; Dallimore, Hertenstein & Platt, 2017). For this reason, IWBs are considered a helpful technology that can generate motivation and engagement among students. As the evolution of ICT develops at an unprecedented

speed, IWBs have emerged as a favoured educational technology in many countries. Higher educational institutions worldwide are recognising that IWBs can enhance both teaching and learning (Bradley & Lomicka, 2017).

While there have been some calls for the examination of IWBs across the curriculum, and current research has begun to examine the pedagogical methodologies and instructional strategies related to IWB use (Cheang, 2019; Rana, Greenwood, Fox-Turnbull, & Wise, 2018), the majority of studies emphasise primary school teachers and students, with the technology being introduced primarily within the English and music curricula (SkevSpread01; Quay, 2009). Further research in this field is crucial if we are to maximise the benefits of the IWB and provide recommendations on best practices for its use in various educational settings.

Research problems

Even though technology in education is becoming increasingly important, many private secondary schools in Calabar Municipality, Cross River State. continue to rely on traditional teaching methods, neglecting the potential benefits of digital tools in enhancing teaching effectiveness. The persistent use of chalkboards and outdated teaching methods limits student engagement and academic performance, hindering their preparation for an increasingly technology-driven world.

Research has shown that integrating technology can significantly enhance teaching methods, improve student outcomes, and increase academic achievement. However, there is a dearth of empirical evidence on the specific impact of technology on teaching methods among private secondary schools in Calabar Municipality. The existing literature focuses primarily on public schools or other geographical contexts, leaving a knowledge gap regarding the unique challenges and opportunities faced by private secondary schools in this region.

Furthermore, the rapid evolution of educational technology necessitates an investigation into the current state of technology adoption and its effects on teaching methods in private secondary schools. The absence of up-to-date research in this area hinders informed decision-making and policy development, potentially perpetuating ineffective teaching practices and undermining student success.

The present work hoped to address the impact of technology on teaching methods among private secondary schools in the research area, By exploring the extent of technology integration, identifying challenges, and assessing the effectiveness of technology-enhanced teaching, this research will enhance helpful ideas for educators, policymakers, as well as stakeholders invested in improving educational outcomes in the region.

Theoretical Background

Self-efficacy theory (Albert Bandura, 1986)

The Self-efficacy theory was propounded by Bandura in 1986. The theory adds to our understanding of human motivation. Researchers have demonstrated that one's self-

determination is a primary internal motivator that personal and environmental factors can influence, and that it impacts motivational outcomes, including choice, effort, creativity, and achievement. According to Gallagher (2012), the concept of self-sufficiency is underpinned by the importance of their individual and singular view of their ability as a significant determinant of positive outcomes. This theory is a significant part of Bandura's Social Cognitive Theory, which advocates for a high level of connection between individual modes of behaviour, environment, and mental factors.

Self-reflection is one of the animal skills which is generally common in humans. Thus, people have a plain ingredient of socio-mental theory. Bandura's self-efficacy is also a social construct that can be significant for a "class soul." Aggregate frameworks foster a feeling of collective practicality, a group with common convictions in its capacity to achieve objectives and accomplish desired tasks. Schools create aggregate beliefs, for example, about whether their students can learn, about their teachers' abilities to teach, and whether they can improve their students' lives. Their policymakers create conditions that support these efforts. The Self-Efficacy Theory (SET), first proposed by Albert Bandura in 1986, serves as a crucial theoretical foundation for understanding the relationship between teacher professional development and student academic performance, particularly in the context of technology integration for private secondary schools in Calabar Municipality, Cross River State. At its heart, the theory posits that people's belief in their ability to execute specific tasks plays a crucial role in their motivation, behaviour, and accomplishment in meeting desired goals.

In the area of education, the focused consideration of how teachers' beliefs about their technological capabilities can impact their utilisation of technology for instructional purposes can be framed in terms of Self-Efficacy Theory. By the way, Bandura (1997) described self-efficacy as one's belief in one's capability to perform the actions needed to reach certain goals. In the present study, teachers' perceived self-efficacy in using technology, specifically interactive whiteboards, serves as a strong determinant of whether they will adopt and apply such innovations in their teaching.

Teachers with strong self-efficacy in the use of ICTs are more likely to implement technology with confidence, and creative educators are more likely to design engaging lessons. Estimation of the predictor effect: Students with low self-efficacy often have problems related to anxiety, doubt, or resistance, leading to very limited or very inefficient use of technology in school. Bandura identified four primary factors that influence self-efficacy, including previous experiences (success in similar efforts), vicarious experiences (observing others similar to oneself complete them), verbal persuasion (encouragement from others), and one's physiological state (mood, stress, and physical condition).

This theory is particularly applicable to the present work, as it helps to explain the psychological and situational conditions that affect teachers' inclination to implement technology-mediated teaching strategies. An analysis of teachers' self-efficacy in the application of interactive whiteboards and other digital devices can reveal the keys to success and failure in private secondary schools in terms of technology application.

In addition, SET provides us with information on how positive interactions with technology can serve to build a teacher's self-efficacy, which should have implications for the continued growth in instructional quality and student outcomes. Negative experiences or lack of support can, on the other hand, contribute to lowered self-efficacy and continued dependence on traditional teaching methods. Utilising these concepts provides a more nuanced perspective on the complex relationships among teacher mindset, professional development, and technology use, through which they can guide the work of educational stakeholders interested in leveraging digital tools thoughtfully to maximise teaching effectiveness and learner outcomes.

Purpose of the Study

This research aimed to investigate the influence of technology on teaching methods in private secondary schools, with a particular emphasis on the introduction of interactive whiteboards in Calabar municipality, Cross River State, Nigeria. Specifically, this research seeks to discover the influence of:

1. To examine the extent to which technology is integrated into teaching methods among private secondary schools in Calabar Municipality, Cross River State.
2. To evaluate the impact of technology integration on teaching effectiveness and student learning outcomes in private secondary schools in Calabar Municipality

Research Questions

1. How do private secondary school teachers in Calabar Municipality utilise technology to enhance teaching methods and student engagement?
2. What is the correlation between technology integration and student academic performance in private secondary schools in Calabar Municipality?

Research Hypotheses.

1. There is no significant difference in teaching effectiveness between private secondary school teachers who use technology and those who do not in Calabar Municipality.
2. Technology integration has no significant impact on student academic performance in private secondary schools in Calabar Municipality

Methodology

Research design

To determine the impact of technology on the teaching and learning of Education in private secondary schools in Calabar Municipality, Cross River State, Nigeria, the study employed a mixed-methods research design by using a combination of both quantitative and qualitative approaches. The survey research design was employed to handle the quantitative aspect, and a total of 115 teachers and 115 students from private

secondary schools in the municipality were selected through a combination of purposive and simple random sampling techniques. Teachers answered a structured questionnaire that measured their technology integration, teaching practices, and attitudes, and students responded to another questionnaire that included items examining their technology use, engagement, and learning results. To ensure the validity and reliability, the questionnaires were pilot-tested on a cluster of teachers and students. Internal reliability of the questionnaires was evaluated by calculating Cronbach's alpha. Observers were trained and calibrated to ensure inter-rater reliability. Validating the qualitative results: member checking and peer debriefing.

Data analysis commenced with descriptive statistics to summarise the quantitative data, which was followed by inferential statistics (independent t-test for hypothesis testing and regression analysis) to determine relationships between the variables. In the interests of ethical practices, participants provided informed consent and were assured of confidentiality and anonymity. Permission to conduct the study in schools and with patients was obtained from the school and educational authorities prior to implementation.

Results

Hypothesis One: "There is no significant difference in teaching effectiveness between private secondary school teachers who use technology and those who do not in Calabar Municipality.

Table 1: Independent t-test for difference in teaching effectiveness between private secondary school teachers who use technology and those who do not in Calabar Municipality (N=115)

Utilization of instructional materials	N	$\bar{X}$	SD	t-value	p-level
Technology method	68	14.03	2.79	7.337*	.000
Conventional method	47	12.62	2.68		

*Significant at .05 alpha level; df=113; p<.05.

An independent t-test was used to compare the teaching effectiveness between private secondary school teachers who use technology and those who do not in Calabar Municipality, with a significance level of .05, as presented in Table 1. The results in Table 1 revealed that integrating technologies had a mean score of 14.03 with a standard deviation (SD) of 2.79, obtained by the 68 students, which is greater than the mean score of 12.62 with an SD of 2.68, obtained by the 47 students categorised as engaging in the conventional method of learning. The mean difference is said to be statistically significant because the calculated t-value of 4.457 with a p-value of .000 at 113 degrees of freedom produced a p-value that is less than .05. This implies that the null hypothesis stating that no significant difference in teaching effectiveness exist between private secondary school teachers who use technology and those who do not in Calabar

Municipality was rejected, indicating that significant difference in teaching effectiveness exist between private secondary school teachers who use technology and those who do not in Calabar Municipality.

Hypothesis Two: Technology integration has no significant impact on the academic performance of students in private secondary schools in Calabar Municipality.

TABLE 2: Simple regression analysis of the influence of integration has no significant impact on student academic performance in private secondary schools in Calabar Municipality. (N=115)

Source of variation	SS	Df	MS	F	p-value
Regression	98.272	1	98.272	13.233*	.000 ^b
Residual	2422.829	113	5.443		
Total	2521.101	114			

*significant at .05 level, Adj. R²=.108

To analyse the data in Table 2, simple linear regression analysis was used. The analysis in Table 2 indicated that the Adj R² is 0.108. This implies that 10.8% of the variance in student academic performance could be accounted for by technology such as the use of an Interactive whiteboard. Although the percentage contribution is small, a cursory examination of the table revealed that $F = 13.233$ ($p < .05$) is significant. Moreover, since $p (.000)$ is less than $p (.05)$, it suggests that the academic achievement of students in Calabar Municipality's private secondary schools is significantly influenced by technology integration. Therefore, the alternative hypothesis is immediately accepted and the null hypothesis is rejected.”

Discussion of findings

The findings of this study indicated a significant difference in the teaching effectiveness of private secondary school teachers who use technology and those who do not in Calabar Municipality. The line of reasoning in this current hypothesis is consistent with the research findings of Bao (2022), which suggest that the implementation of effective technology integration supports teachers in developing learning environments tailored to meet different learning preferences and needs. In the author's view, digital assets, including educational software, learning management systems, and multimedia, provide interactive and immersive learning experiences that facilitate comprehensive examination and relief. To add to the challenge, digital literacy, critical thinking, collaboration, and communication skills are what are needed to be a success in the twenty-first century”. A study also asserts that, “technology-enhanced teaching can promote active learning, and encourage student engagement and development of core

competencies such as problem- solving and collaboration (Bidin, Leong, & Hong, 2019).”

The results also showed that the integration of technology has a significant influence on the academic performance of students in private secondary schools. This finding is consistent with the study by Hew and Wu (2020), which found that technology integration in teaching has become an important aspect of contemporary education, changing the way teachers teach and students learn. The authors believe that the importance of technology in teaching goes beyond making it easier; in fact, it enriches the teaching process, increases students’ involvement and fosters achievement. Enhanced motivation, improved academic achievement, and enhanced career-preparatory activities have been reported to result in better student learning outcomes when technology is used (Chu, Banning, and Hossain, 2020).

Conclusion and Recommendations

The study found that technology has a significant influence on teaching **methods** and the academic performance of students. Specifically, the study reveals a significant difference in the teaching effectiveness of private secondary school teachers who use technology in their teaching and those who do not in Calabar Municipality, and that technology integration has a significant effect on the academic performance of secondary school students in Calabar Municipality.

Sequel to the research findings in this work, these recommendations were presented by the researcher:

1. Administrators of schools make an effort to prioritise technology integration by affording teachers with training and digital tools to enhance teaching effectiveness. Policymakers should develop policies promoting technology-enhanced learning objectives to improve student academic performance.
2. Additionally, educational stakeholders should invest in technological infrastructure and professional development programs to give educators the tools they need to integrate technology into their lesson plans successfully.

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