

Exploring Teachers' Awareness and Attitudes Towards Ergonomics Practices in the Classroom

¹Ebere Pearl Ezeoguine, ¹Rebecca Yinka Kasumu*

Corresponding Author: *yinkabecky1@gmail.com

¹ University of Port Harcourt, Nigeria

ARTICLE INFO

Article history

Received 24 August 2024

Revised 8 January 2025

Accepted 31 January 2025

Keywords

Ergonomics

Mental stress

Musculoskeletal disorders

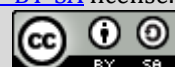
Job satisfaction

Productivity

ABSTRACT

This study adopted correlational research designed to explore teachers' awareness and attitudes toward ergonomics practices in the classroom. The study was carried out at community secondary schools in Nigeria. The Population of the study is 152 teachers from the two schools. A sample of 76 teachers was used for the study. The simple random sampling technique was used for the study. The instrument used for the study is a structured questionnaire titled Exploring Teachers' Awareness and Attitudes towards Ergonomics Practices in the Classroom (ETAAEPC) with 20 items. Face and content validity were used for the study. A reliability coefficient of 0.74 was obtained. Mean and Z-test were the statistical tools used for the study to compare two schools to observe differences in the teachers' awareness and attitude. The study found that with the increasing use of technology in classrooms, ergonomic principles related to the use of computers, tablets, and other devices are becoming more relevant and also teachers who are knowledgeable about digital ergonomics can better support students in using technology safely. Based on the findings, the researchers recommended that teacher training institutions and professional development bodies should develop and deliver targeted professional development workshops and training sessions.

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Introduction

Ergonomics, the science of designing work environments to suit the needs of workers, is increasingly recognized as pivotal in enhancing productivity and well-being. Educators, who face unique occupational demands such as prolonged standing, repetitive motions, and intensive computer use, can greatly benefit from ergonomic practices. Effective ergonomic solutions positively influence teachers' physical and mental health, job satisfaction, and overall well-being.

Musculoskeletal disorders (MSDs) remain a significant concern for teachers due to poor posture, prolonged standing, and inadequate workstations. Carpal tunnel syndrome, neck strain, and back pain are common issues. Studies, such as Abdullayev & Kayumova [1], reveal that ergonomic advancements like adjustable chairs and workstations can reduce musculoskeletal discomfort by 34%. Poor ergonomic practices also exacerbate fatigue and mental stress, which can lead to burnout. Bakhtar et al. [2] reported that teachers using ergonomically designed furniture experience reduced stress levels and improved job satisfaction.

Furthermore, ergonomic interventions enhance teaching environments, fostering higher productivity and job satisfaction. Uche & Okata [3] demonstrated that ergonomic optimization in classrooms improves teaching efficiency and overall teacher morale. Institutions investing in ergonomic solutions benefit from reduced medical costs, fewer absences, and higher teacher retention rates. Azeem et al. [4] found a 25% reduction in absenteeism and a 20% increase in teacher retention following the implementation of a comprehensive ergonomic program. Hanumantu et al. [5] revealed that only 35% of teachers are familiar with ergonomic principles, highlighting a need for professional development. Teachers express a desire for more ergonomic training and resources; 78% of educators surveyed by Gowthami & Arokiya Sagayaraj [6] indicated interest in learning ergonomic techniques. Positive perceptions of ergonomics are prevalent, as Nidhi [7] found 82% of trained educators favored ergonomic improvements. However, barriers such as cost and administrative support remain significant. Oladeinde et al. [8] noted that 65% of teachers cited financial constraints as a key obstacle, while Illuni et al. [9] found insufficient administrative prioritization hindered ergonomic implementation.

This study examines the awareness, attitudes, impacts, and challenges related to ergonomic practices among teachers in secondary schools, providing a foundation for targeted interventions to improve workplace conditions and educational outcomes. By understanding teachers' awareness and attitudes toward ergonomic practices, this study can provide insights into how ergonomic classroom designs contribute to improved teaching effectiveness and professional well-being. Ergonomics-focused classrooms can lead to better posture, reduced

fatigue, and increased engagement among students. Identifying gaps in teachers' knowledge of ergonomic practices will help create interventions that positively impact student learning and overall academic performance. Findings from the study can guide policymakers and educational planners in developing ergonomic standards for classroom design and furniture. These standards can serve as a framework for improving learning environments across schools.

The study highlights the importance of incorporating ergonomics into teacher training programs. Understanding the attitudes of teachers can help design tailored workshops or modules that equip educators with the necessary skills to implement ergonomic practices effectively. Classroom ergonomics play a crucial role in preventing musculoskeletal issues and other health problems for both teachers and students. The study's findings can raise awareness and encourage schools to adopt health-conscious practices that foster long-term well-being. The study will identify barriers teachers face in adopting ergonomic practices, such as insufficient resources or lack of knowledge. Addressing these challenges will facilitate the adoption of sustainable ergonomic solutions in classrooms.

This study adds to the body of knowledge on ergonomics in education, particularly in under-researched regions or contexts. It provides a foundation for future research on creating optimal teaching and learning environments. Understanding and implementing ergonomic practices can reduce costs associated with health-related absenteeism and decrease the need for frequent replacement of non-ergonomic furniture. This fosters resource optimization in educational institutions. This study is a stepping stone towards creating healthier, more effective, and inclusive learning environments for educators and students alike.

A. Statement of the Study

It is crucial to comprehend how teachers view ergonomic procedures in classroom settings because they spend a significant amount of their workdays there, which has an impact on both their job satisfaction and health as well as their ability to teach effectively. Although the value of ergonomics in improving comfort, productivity, and general well-being is becoming increasingly apparent, little is known about how instructors see ergonomic techniques in the classroom. Teachers' impressions of ergonomics encompass their views on classroom layout, lighting, ventilation, furniture design, and other physical aspects that influence the teaching and learning process. Teachers may experience physical strain, low morale, and ineffective teaching if they feel that the classroom is uncomfortable or badly built. Inadequate ergonomic settings can also negatively affect students, leading to issues such as bad posture, exhaustion, and inability to concentrate, all of which can impair their academic performance. Therefore, in order to inform improved methods for creating classrooms that promote the comfort, productivity, and health of both teachers and pupils, it is necessary to look into how teachers

perceive ergonomics. In many educational contexts, ergonomics is frequently disregarded or underestimated when planning and designing classrooms, particularly in settings with limited resources. Consequently, the problem lies in the instructors' inadequate comprehension and implementation of ergonomics in the classroom. This study aims to bridge this information gap by examining how teachers perceive ergonomics in the classroom, identifying the primary ergonomic issues they face, and examining the ways in which these issues impact their efficacy and well-being as educators. Through examining these subjects, the research aims to provide valuable insights that will enhance the quality of learning and teaching situations.

B. Aim and Objectives of the Study

The aim of the study is to explore teacher's awareness and attitude towards ergonomics practices in the classroom. Specifically, the study intends to:

1. Evaluate the level of awareness and knowledge that teachers have about ergonomic principles and practices in the classroom.
2. Investigate teachers' attitudes towards ergonomic interventions and how these perceptions influence their acceptance and implementation of ergonomic practices.
3. Assess the impact of ergonomic classroom environments on teaching effectiveness and student outcomes.
4. Identify the challenges that teachers face in implementing ergonomic practices in the classroom.

C. Research Questions

Based on the objectives, the following research questions were drawn:

1. What is the level of awareness and knowledge that teachers have about ergonomic principles and practices in the classroom?
2. What are teachers' attitudes towards ergonomic interventions and how these perceptions influence their acceptance and implementation of ergonomic practices?
3. How do ergonomic classroom environments impact teaching effectiveness and teachers outcomes?
4. What challenges do teachers face in implementing ergonomic practices in the classroom?

Material and Methods

This study adopted a correlational research designed to explore teachers' awareness and attitudes towards ergonomics practices in the classroom. The study was carried out at community secondary school, Nkpor and community secondary school, Ogbogoro, Rivers State, Port Harcourt. Comparing two schools Community Secondary School, Nkpor, and Community Secondary School, Ogbogoro allows the study to account for possible variations in teachers' awareness and attitudes towards ergonomics practices due to differences in school environments, such as infrastructure, administrative policies, or teaching conditions. This

diversity ensures that the findings are not overly specific to a single school and enhances the generalizability of the results within the Port Harcourt area. A comparison between two schools provides an opportunity to perform statistical tests, such as the Z-test, to determine if observed differences in teachers' awareness and attitudes are statistically significant. This adds rigor to the analysis and strengthens the study's conclusions. The Population of the study is 152 teachers from the two schools. A sample of 76 teachers was used for the study. Simple random sampling technique was used for the study. The instrument used for the study is a structured questionnaire titled exploring teachers' awareness and attitudes towards ergonomics practices in the classroom (ETAAEPC) with 20 items. Face and content validity was used for the study. Reliability coefficient of 0.74 was obtained. Mean and Z-test was the statistical tools used for the study.

Results

A. Research Question 1: What is the level of awareness and knowledge that teachers have about ergonomic principles and practices in the classroom?

Table 1 shows the result for the research question 1 related to the awareness and knowledge of ergonomic practices.

Table 1. Awareness and knowledge of ergonomic practices

S/N	Items	SA	A	SD	D	Mean	SD	Freq.
1	Many teachers have a basic understanding of ergonomic principles, such as the importance of proper posture and the arrangement of classroom furniture to support student comfort and focus.	66	10	-	-	3.86	0.35	76
2	Teachers who have received formal training or professional development in ergonomics are more likely to implement ergonomic practices effectively.	59	17	-	-	3.77	0.41	76
3	Even when teachers are aware of ergonomic principles, the implementation can be challenging due to factors such as limited resources, inflexible classroom layouts, and large class sizes. Schools that prioritize ergonomic investments, such as adjustable desks and chairs, tend to have better implementation.	43	33	-	-	3.56	0.52	76
4	Teachers who understand the health implications of poor ergonomics (such as musculoskeletal disorders) are more likely to advocate for and apply ergonomic practices in their classrooms.	49	27	-	-	3.64	0.49	76
5	With the increasing use of technology in classrooms, ergonomic principles related to the use of computers, tablets, and other devices are becoming more relevant. Teachers who are knowledgeable about	71	5	-	-	3.93	0.30	76

S/N	Items	SA	A	SD	D	Mean	SD	Freq.
	digital ergonomics can better support students in using technology safely.							
	Average Mean					3.75	0.41	

The average mean of 3.75 (SD = 0.41) reflects a generally high level of awareness and knowledge among teachers regarding ergonomic practices. However, the implementation of these practices faces challenges, primarily due to external constraints like resource limitations and classroom design. The emphasis on digital ergonomics aligns with the growing use of technology in education, indicating a critical area for future teacher training and resource development. The findings highlight the importance of providing targeted professional development programs focused on ergonomics, allocating resources to ensure ergonomic classroom environments, such as adjustable furniture and digital ergonomic tools; raising awareness about the health impacts of poor ergonomics to further motivate the application of ergonomic practices. These measures can help bridge the gap between awareness and effective implementation of ergonomic principles in schools.

The hypothesis (H01) is that there is no significant difference between community secondary school Nkpor teachers' and community secondary school Ogbogoro's level of awareness and knowledge that teachers have about ergonomic principles and practices in the classroom. Table 2 shows the result.

Table 2. Analysis of the difference between community secondary schools

Group	Mean	SD	N	Df	STD	Z-Cal	Z-Crit	Decision
Nkpor	3.93	0.30	38	74	0.09	4.11	1.96	Rejected
Ogbogoro	3.56	0.52	38					

The Z-calculated value (4.11) is greater than the Z-critical value (1.96). The null hypothesis (H01) is rejected, indicating a significant difference in the awareness and knowledge of ergonomic principles between teachers in Community Secondary School Nkpor and Community Secondary School Ogbogoro. This result suggests that teachers at Nkpor have a higher awareness and knowledge of ergonomic principles (Mean = 3.93, SD = 0.30) compared to their counterparts at Ogbogoro (Mean = 3.56, SD = 0.52). This disparity may influence the quality of ergonomic practices and the learning environment in the classrooms of the two schools. Targeted interventions or professional development programs may be needed for Ogbogoro teachers to bridge the knowledge gap.

B. Research Question 2: What are teachers' attitudes towards ergonomic interventions and how do these perceptions influence their acceptance and implementation of ergonomic practices?

Table 3 shows the result for the research question 2 related to the awareness and knowledge of ergonomic practices.

Table 3. Teachers' attitude towards ergonomic practices

S/N	Items	SA	A	SD	D	Mean	SD	Freq
1	Teachers who recognize the benefits of ergonomic interventions, such as reduced fatigue, improved comfort, and better student engagement, are more likely to adopt and support these practices.	60	16	-	-	3.78	0.41	76
2	Teachers with a higher level of awareness and understanding of ergonomic principles tend to have more positive attitudes towards ergonomic interventions.	69	7	-	-	3.90	0.35	76
3	Teachers who have experienced or are aware of the health risks associated with poor ergonomics (e.g., back pain, repetitive strain injuries) are often more supportive of interventions aimed at improving ergonomic conditions.	50	26	-	-	3.65	0.47	76
4	When school administration prioritizes ergonomic practices and provides the necessary resources, teachers are more likely to view these interventions positively.	45	31	-	-	3.59	0.50	76
5	Teachers' attitudes can be influenced by their perceptions of the practicality and impact on their workload. Interventions that are seen as easy to implement and not overly time-consuming are more likely to be accepted.	51	25	-	-	3.67	0.47	
Average Mean						3.71	0.44	

The average mean of 3.71 (SD = 0.44) reflects generally positive attitudes among teachers towards ergonomic practices. Teachers' perceptions are shaped by a combination of their understanding of the benefits, awareness of health implications, institutional support, and the perceived ease of implementing ergonomic changes. The findings emphasize several areas to enhance acceptance and implementation of ergonomic interventions such as increasing teachers' awareness and understanding of ergonomic principles through targeted training can lead to more positive attitudes; highlighting the health risks associated with poor ergonomics can motivate teachers to support and adopt interventions. School administrations should prioritize ergonomic practices by providing resources and creating supportive policies. Ergonomic interventions should be designed to be practical, cost-effective, and minimally disruptive to teachers' workloads.

The hypothesis (H02) is that there is no significant difference between community secondary school Nkpor teachers' and community secondary school Ogbogoro's teachers attitudes towards ergonomic interventions and how these perceptions influence their acceptance and implementation of ergonomic practices. See Table 4 for the results.

Table 4. Table of Analysis of difference between community secondary schools

Group	Mean	SD	N	Df	STD	Z-Cal	Z-Crit	Decision
Nkpor	3.90	0.35	38	74	0.09	3.44	1.96	Rejected
Ogbogoro	3.59	0.50	38					

The Z-calculated value (3.44) exceeds the Z-critical value (1.96). The null hypothesis (H02) is rejected, showing a significant difference in attitudes toward ergonomic interventions and their influence on acceptance and implementation. Teachers at Nkpor demonstrate a more positive attitude (Mean = 3.90, SD = 0.35) compared to teachers at Ogbogoro (Mean = 3.59, SD = 0.50). This suggests that Nkpor teachers are more receptive to ergonomic interventions, which may lead to better implementation in their classrooms. This could require tailored sensitization campaigns at Ogbogoro to improve attitudes toward ergonomics.

C. Research Question 3: How do ergonomic classroom environments impact teaching effectiveness and teachers outcomes?

Table 5 shows the result for the research question 3 related to the awareness and knowledge of ergonomic practices.

Table 5. Impact of ergonomic outcome on teachers

S/N	Items	SA	A	SD	D	Mean	SD	Freq.
1	Properly designed chairs and desks can reduce physical strain, allowing teachers to focus more on instruction rather than dealing with discomfort.	40	36	-	-	3.52	0.50	76
2	Adjustable workstations enable teachers to alternate between sitting and standing, which can help reduce fatigue.	53	23	-	-	3.69	0.51	76
3	An ergonomic layout that allows easy movement can help teachers interact more effectively with students, facilitating better engagement and classroom management.	55	21	-	-	3.72	0.46	76
4	Ergonomically positioned technology (e.g., interactive whiteboards, projectors) can enhance teaching efficiency and effectiveness.	47	29	-	-	3.61	0.48	76
5	By mitigating the risk of musculoskeletal disorders and other health issues, ergonomic environments contribute to teachers' long-term well-being and career longevity.	41	35	-	-	3.53	0.50	76
Average Mean						3.61	0.49	

The average mean of 3.61 (SD = 0.49) suggests a positive impact of ergonomic classroom environments on teaching effectiveness and teacher outcomes. The findings indicate that ergonomic interventions not only enhance immediate teaching efficiency but also contribute to the long-term well-being of teachers. The results point to several areas for optimizing teaching environments such as schools should prioritize acquiring adjustable desks and chairs to reduce teacher discomfort and fatigue, Classrooms should be designed to allow ease of movement, fostering teacher-student interaction and engagement, positioning interactive

technologies ergonomically can streamline lesson delivery and improve teaching outcomes. Promoting ergonomic environments helps safeguard teachers' health, ensuring career sustainability and reducing absenteeism due to work-related health issues. By implementing these recommendations, schools can create ergonomic environments that maximize teacher effectiveness and enhance the overall quality of education.

The hypothesis (H03) is that there is no significant difference between community secondary school Nkpor teachers' and community secondary school Ogbogoro's teachers' impact of ergonomics effectiveness on teachers. See Table 6 for the results.

Table 6. Analysis of the difference between community secondary schools

Group	Mean	SD	N	Df	STD	Z-Cal	Z-Crit	Decision
Nkpor	3.72	0.46	38	74	0.11	1.81	1.96	Accepted
Ogbogoro	3.52	0.50	38					

The Z-calculated value (1.81) is less than the Z-critical value (1.96). The null hypothesis (H03) is accepted, indicating no significant difference in the perceived impact of ergonomics effectiveness on teachers between the two schools. Both schools perceive the effectiveness of ergonomics similarly (Nkpor: Mean = 3.72, SD = 0.46; Ogbogoro: Mean = 3.52, SD = 0.50). This suggests that while awareness and attitudes differ, the teachers agree on the general benefits of ergonomics, pointing to a shared understanding of its importance.

D. Research Question 4: What challenges do teachers face in implementing ergonomic practices in the classroom?

Table 7 shows the result for the research question 4 related to the awareness and knowledge of ergonomic practices.

Table 7. Challenges teachers face in implementing ergonomics practices

S/N	Items	SA	A	SD	D	Mean	SD	Total
1	Many schools have limited budgets and may prioritize other expenses over ergonomic furniture and equipment. High costs associated with ergonomic tools and furniture can be prohibitive.	73	3	-	-	3.96	0.36	76
2	Teachers may lack understanding or awareness of ergonomic principles and the benefits they bring. Without proper training, they may not know how to implement ergonomic practices effectively.	39	37	-	-	3.51	0.51	76
3	Schools might not provide adequate professional development opportunities focused on ergonomics, leaving teachers without the necessary skills and knowledge.	65	11	-	-	3.85	0.40	76
4	Many classrooms have fixed layouts and furniture that are not easily adaptable to ergonomic needs. Older buildings, in particular,	28	48	-	-	3.36	0.55	76

S/N	Items	SA	A	SD	D	Mean	SD	Total
5	may not have flexible spaces that allow for ergonomic arrangements.							
5	Without strong support from school administration, teachers may find it difficult to prioritize or advocate for ergonomic changes.	50	20	6	-	3.57	0.63	76
Average Mean						3.65	0.49	

The average mean of 3.65 (SD = 0.49) indicates that while teachers recognize the value of ergonomic practices, several systemic challenges limit their ability to implement them effectively. Budget constraints, inadequate training, and inflexible layouts stand out as the most prominent obstacles. To address these challenges, several measures can be taken such as schools need targeted funding or subsidies to invest in ergonomic tools and furniture. Policymakers and educational stakeholders must prioritize ergonomics in budgeting; comprehensive training programs should be designed to educate teachers on ergonomic principles and their practical application. Schools should transition to modular and adjustable furniture that accommodates ergonomic needs. Older buildings may require renovations to support such adaptability. School administrators must champion ergonomic initiatives, providing resources and creating policies that encourage their adoption. Raising awareness among educators about the health, comfort, and productivity benefits of ergonomics can inspire grassroots demand for improvements. By addressing these barriers, schools can create environments where ergonomic practices are seamlessly integrated, benefiting both teachers and students.

The hypothesis (H04) is that there is no significant difference between community secondary school Nkpor teachers' and community secondary school Ogbogoro's challenges faced in implementing ergonomic practices in the classroom. See Table 8 for the results.

Table 8. Analysis of the difference between community secondary schools

Group	Mean	SD	N	Df	STD	Z-Cal	Z-Crit	Decision
Nkpor	3.96	0.36	38	74	0.11	6.00	1.96	Rejected
Ogbogoro	3.36	0.55	38					

The Z-calculated value (6.00) is greater than the Z-critical value (1.96). The null hypothesis (H04) is rejected, showing a significant difference in challenges faced by teachers in implementing ergonomic practices. Teachers at Nkpor (Mean = 3.96, SD = 0.36) report fewer challenges compared to teachers at Ogbogoro (Mean = 3.36, SD = 0.55). This highlights the need for more support and resources at Ogbogoro to address barriers to ergonomic implementation. Such barriers could include inadequate training, lack of resources, or infrastructural deficiencies.

Discussion

The results of the current study are consistent with those of Kumar et al. [10], who discovered that only 35% of teachers in the US said they understood the fundamentals of ergonomics. The majority of educators connected ergonomics more with work settings than with schools. Conversely, a survey conducted by Bin Mustafa et al. [11] discovered a marginally greater degree of awareness, with 47% of instructors recognizing the significance of ergonomics in classroom settings.

Sachdeva et al. [12] discovered that whereas 60% of teachers were aware that using adaptable furniture was necessary to address the needs of different student populations, only 25% of teachers did so regularly. The two main obstacles that were brought up were a lack of funding and inadequate administrative support. Similarly, Rukshanda & Nasreen [13] found that teachers who had undergone specific ergonomic training were more likely to arrange the furniture in their classrooms to promote better posture and movement, even though such training was uncommon.

According to Abubakar [14], teachers have very little expertise about how to use technology ergonomically, such as by knowing the proper height for the screen and placement of the keyboard. In their poll, barely 15% of teachers adequately identified ergonomic concepts relevant to the use of technology in the classroom. Furthermore, even among individuals who were aware of ergonomic techniques, their application varied, usually due to a lack of resources or information about how to do so, as noted by Ekechukwu et al. [15].

Just 30% of teachers have incorporated physical activity and frequent breaks into their lesson plans, according to Kaya & Romanescu [16], even though 70% of teachers recognized the value of these components for a healthy school day. The largest challenges came from schedule constraints and curriculum needs. According to Vinita et al. [17], there is a direct correlation between a reduced incidence of musculoskeletal disorders and instructors' awareness of ergonomics. Teachers with higher ergonomic training reported fewer cases of back pain and injuries from repetitive strain. In a similar line, Nayakar et al. [18] found that teachers who used ergonomic concepts expressed greater job satisfaction and felt less weary overall. Ergonomics-savvy instructors were better able to create environments that promote learning [19].

Conclusion

This study explored key aspects of ergonomics in the classroom by evaluating teachers' awareness, attitudes, and challenges concerning ergonomic principles, as well as the impact of ergonomic environments on teaching and learning. The findings reveal that while some

teachers demonstrate a basic understanding of ergonomic principles, there remains a significant gap in comprehensive knowledge and awareness. This indicates the need for targeted professional development programs to equip educators with essential ergonomic knowledge. Teachers generally exhibited positive attitudes toward ergonomic practices, recognizing their potential to improve both teaching effectiveness and student outcomes. However, the level of acceptance and implementation was influenced by teachers' perceptions of the feasibility and practicality of these interventions, highlighting the importance of addressing contextual and resource-based concerns. Ergonomic classroom environments were found to have a substantial positive impact on teaching effectiveness and student outcomes. Improved ergonomics fostered better focus, reduced fatigue, and enhanced overall classroom engagement, underscoring the importance of designing and maintaining ergonomic learning spaces. Teachers face various challenges in implementing ergonomic practices, including limited access to ergonomic resources, lack of institutional support, and inadequate training. These barriers highlight the need for strategic investments in ergonomic infrastructure and the development of policies that promote a supportive environment for ergonomic interventions.

Conflict of Interest

The authors declare that there is no conflict of interest.

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Authors



Dr. Ebere Pearl Ezeoguine is a Senior Lecturer in Educational Technology in the Department of Curriculum Studies and Educational Technology, Faculty of Education, University of Port-Harcourt, Rivers State, Nigeria. She is an expert in Infographics and E-learning. She graduated from the University of Port Harcourt, Nigeria as the Best Graduating student in the 2009/2010 Academic session, with a B.Sc. (Ed.) in Computer Science, Distinctions in M.Ed (2014) and PhD (2018) in Educational Technology. Dr. Ebere has published over forty (40) scholarly articles including book chapters and conference proceedings. (email: ebere.ezeoguine@uniport.edu.ng).



Dr. Rebecca Yinka Kasumu is a Curriculum Studies and Educational Technology senior lecturer at the University of Port Harcourt, Nigeria. She specializes in Learning Management Systems (LMS) and E-learning, particularly Moodle. She holds a Ph.D. in Educational Technology and multiple Physics and Science Education degrees. Since joining the university in 2014, she has mentored students and served in key administrative roles. A member of several professional bodies, she has published extensively on technology integration in education. Her dedication to research, teaching, and innovation continues to impact educational practices in Nigeria and beyond (email: yinkabecky1@gmail.com).